JUNE, 1954

Industrial FINISHING

Published Monthly in the Interest of Product Cleaning and Painting by Industrial Publications, Inc., 1143 N. Meridian Street, Indianapolis 4, Ind.

A Safe Sign to Follow

AT RELIANCE, a thorough analysis of all factors involved in any finishing problem is a prerequisite to the formulation of the proper materials to be used. Reliance manufactures "tailor-made" Stains, Fillers, Lacquers, Varnishes, Primers, Undercoats, Enamels and Special Coatings for every known surface, to be applied by spraying, dipping, flowing, roller coating — air dried or baked. May we have the pleasure of serving you?

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CHICAGO, ILL. LOS ANGELES, CALIF.

such as the new aluminum siding for modern homes, will fare better if it's protected with

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The ORIGINAL speed-bake finish.

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This pre-painting, post-forming technique:

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builds sales with special finish, new packaging

Alert to new ideas that will increase sales, the Dixie Furniture Company has created a profitable combination in this modern group of African Mahogany. Their use of a Sapphire finish, custom-styled by Grand Rapids, adds the selling features of eye appeal and durability. New packaging with easy "zipper" type opening allows the dealer to deliver directly to the home without inspection or preparation. These are two examples of how specialized assistance can increase saleability.

The Better the Finish, the Better the Buy

GRAND RAPIDS VARNISH CORPORATION

MAKERS OF THE FAMOUS Guardsman FINISH AND Guardsman CLEANING POLISH

GRAND RAPIDS, MICHIGAN

JUNE, 1954
Vol. XXX, No. 8

BPA

A monthly magazine for finishing room and paint shop foremen, production superintendents, chemists, purchasing agents and company executives of industrial plants where product surface cleaning and finishing are major operations in the manufacture of parts and products of all kinds.

Industrial FINISHING

W. H. ROHR, Editor P. C. BARDIN, Associate Editor

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30 THIRTIETH YEAR OF PUBLICATION

Let Electricity Do It. It might be well to make a complete study of all operations in your plant, especially those performed entirely or partially by hand. Electric motors, packaged adjustable speed drives, as well as all-electric drives engineered for specific applications are available.

Coilers, uncoilers, press feeders, conveyors, metal and wood processing lines and automatic transfer machine tools are just a few types of equipment on which motors and motor drives can be advantageously used. A thorough and comprehensive study of your plant may reveal others.

* * *

Pen-Size Oiler. Pell-i-can is a new pen sized oiler with a long narrow "beak" . . . makes it easy to fill small out-of-way oil holes in movie cameras and projectors, tape recorders, electric shavers, fishing reels, model trains, sewing machines and dozens of other small appliances.

Carry it like a fountain pen.

Pell-i-can is leakproof, easy to refill and unbreakable in normal use. The new oiler features a visible oil supply and handy pocket clip. It avoids spilling by delivering its fine light oil, one drop at a time.

* * *

Dividers for Room Space. Partionettes is the name of a line of stock length and height panels for quick, easy installation to make an office within an office, or in the plant. They are available in steel or wood in ten stock lengths and three heights. Colors in steel are green, gray, or custom colors to specification. In wood, there is genuine walnut, softone oak, and with accoustical panels. No skilled labor required to install; they can be easily moved or rearranged.

* * *

Automation Ready. Automation, currently the glamor idea in factory technology, is not too difficult nor too costly for consideration by corporate management as a "down-to-earth" means for getting greater efficiency, according to H. F. Dever, president of Brown Insustruments Division of Minneapolis-Honeywell Regulator Co.

In a paper given before members of the National Federation of Financial Analysts Societies, Mr. Dever said that automation must either make possible some desirable result that could not be accomplished in any other way, or *it must accomplish some*

Dolan's

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Dolans No. 8800 Hi-Solids Lacquer is formulated at spraying viscosity: requires no thinning. It flows out perfectly to produce a full bodied, tough, durable film, possessing excellent cold check resistance.

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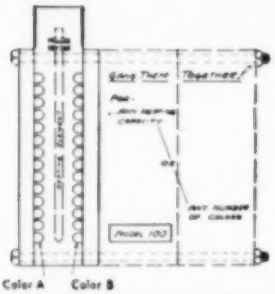

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For the first time brings all the advantages of paint heating within reach of every user. Model 100

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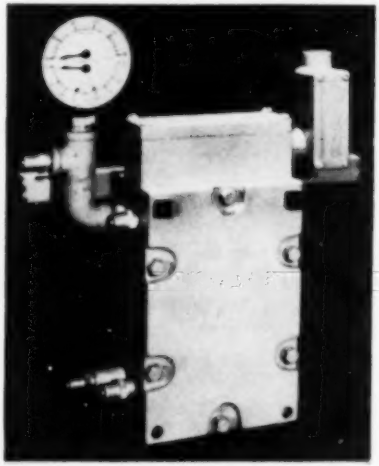

CUT PRODUCTION COSTS!
GET A BETTER FINISH!

With The New

TURNER PAINT WARMER-HEATER

Use as a PAINT WARMER (90-110° F.) to minimize operational difficulties, control viscosity—for 2 spray guns.

Use as a PAINT HEATER (150-180° F.) to lower costs, get a better finish—for 1 spray gun.

HEATERS can be used with: Manual Spray, Automatic Spray, Electrostatic #1 and #2, Dip Tank, Roller Coat.

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TUBULAR HEATERS
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A compact trouble-free unit which can be added to any heater arrangement to get circulation of heated paint right up to spray gun.
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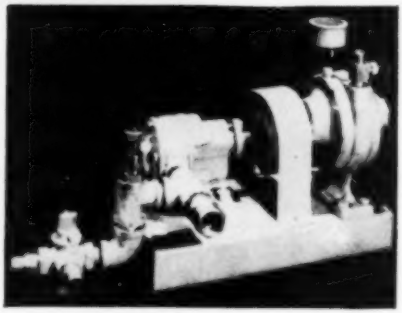

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PAINT WARMERS • AIRLESS ATOMIZATION UNITS • PAINT HEATERS

task, now being performed by older methods, at a net saving in cost. If it won't do one or the other of these things, or both, it will not be economically sound.

The upper levels of management must take hold of the idea of automation, and see that either their own industrial engineers or consultants brought from outside make sure that automation is used wherever it makes economic sense.

* * *

Industrial Wiper. Specially designed to meet the general wiping needs of industry, a brand-new industrial wiper has just been developed and placed on the market by Scott Paper Co., Chester, Penna.

Possessing high wet strength, each wiper is composed of two sheets welded together by a special process to accelerate widespread and efficient absorption of liquids. Its unique "Perf-Embossed" surface gives thorough cleaning action and maximum dirt retention.

* * *

Gas Detectors. Combustible gas detectors for installation in Class I, Group D hazardous locations, to analyze and warn of dangerous concentrations of combustible gas, have been listed for the first time by Underwriters' Laboratories, Inc. Mine Safety Appliances Co., Pittsburgh, manufacturer of the instruments, announces that approval of the units was also received from Associated Factory Mutual Fire Laboratories.

The Underwriters' listing approves the installation of the MSA explosion-proof instruments right in the area where combustible gases or vapors may be present.

Although instruments of this type have been used for some time, this is the first time that all of the design

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Every shipment laboratory tested to rigid standards and your individual specifications.

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1835 COLUMBUS ROAD
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Estab. 1896

obstacles to such a listing have been overcome. They can be used with assurance that they comply with the highest standards of safe design and thus cannot, in themselves, serve as a source of ignition.

* * *

Capital Invesements by manufacturing companies in past years were often made, based on optimism. Today, competition is an added factor, an excellent reason to modernize the plant, equipment and methods. Investments such as these are almost necessary just to stay in business. With scarcities in labor and materials becoming less and less, competition is becoming greater and greater.

* * *

Reconstructed Woods. According to The Chicago Market Daily, published by the American Furniture Mart, case goods, occasional tables and frames for upholstered furniture are being produced from "reconstructed" wood made from small chips, shavings and a limited amount of sawdust and wood flour mixed with resins and a catalyst. This mixture may be pressed into shape or poured to make continuous boards. It is reported that one manufacturer is making painted bedroom furniture entirely of this material.

* * *

Is Your Office Efficient? A lot of effort has been directed to plant efficiency—and the results are obvious. While progress is made in the plant, what about the office? This is also an important adjunct to any successful operation.

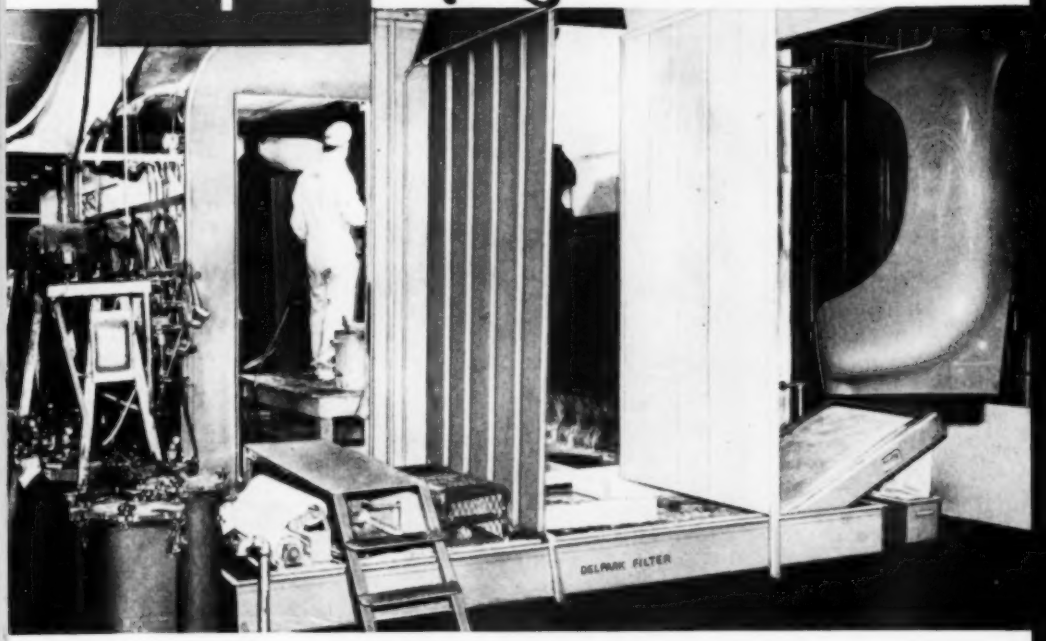
One of the latest contributions to increased office efficiency and reduction of congestion is the Wood Office

(Continued on page 88)

Studebaker

SAVES TIME WITH

Delpark Spray Booth Filters



Automotive Synthetic Enamels, as a rule, are very difficult to handle. Equally difficult is the proper maintenance of spray booths where this type of enamel is used.

To reduce maintenance and cleaning time, the Studebaker Corporation has installed the DELPARK 36138 AFB Unit illustrated. This unit filters over spray from the wash water used in a spray booth where small sheet metal parts are painted.

With this installation, the Studebaker Corporation is effecting important savings in time and money.

If you have spray booths using wash water systems, DELPARK filtration can save you time and money on cleaning and maintenance. *Write today for further information.*

Delpark INDUSTRIAL FILTRATION

BACKED BY MORE THAN 30 YEARS EXPERIENCE IN INDUSTRIAL FILTRATION

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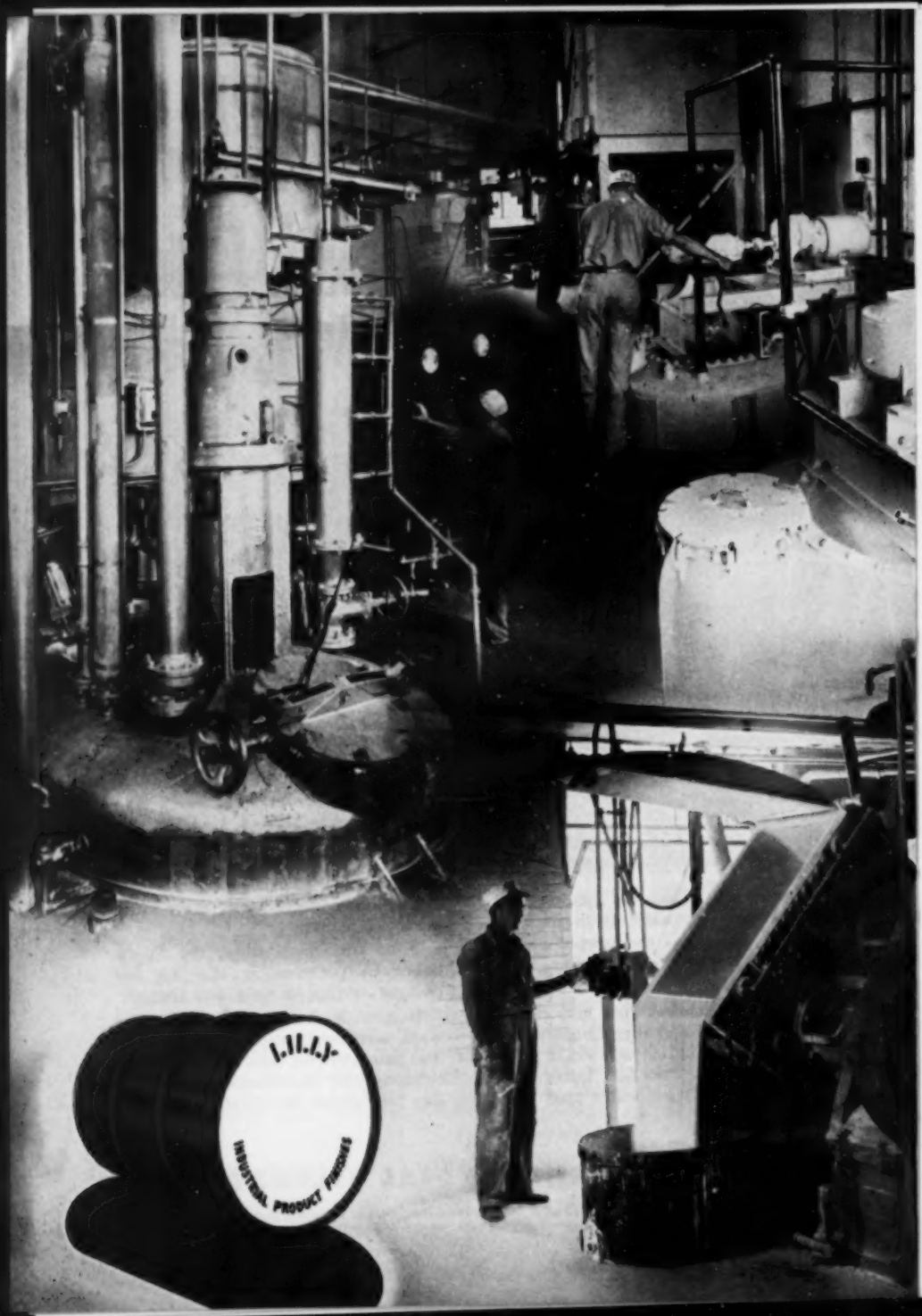
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Whatever the product—
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of manufacturers' individual
needs. Development of
coatings for specific use
is an important part
of the technical services
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industry in the field of
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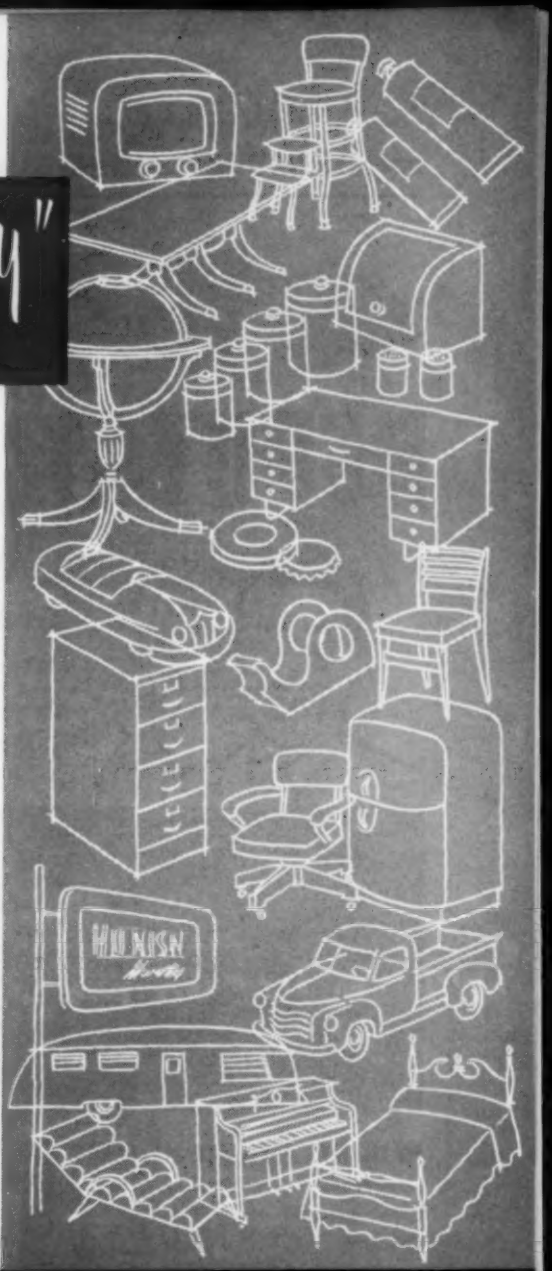

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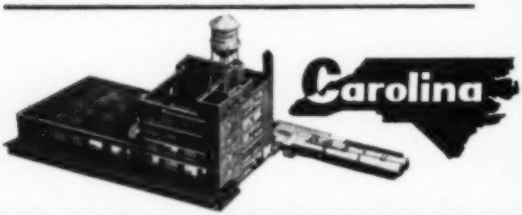
another NATIONAL AFFILIATE story:



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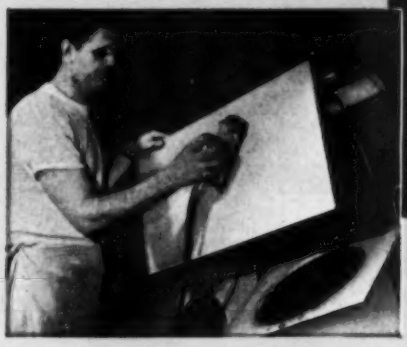
WESTINGHOUSE Laundromat gets a tougher, more corrosion-resistant primer at much lower cost!



Laundromat has a baked Epon, flow-coated primer formulated by Pittsburgh Plate Glass Company. Film uniformity calls for only the briefest scuff sanding before application of the white enamel top-coat.

HERE'S HOW...

The protective finish on a washing machine is exposed to severe conditions during its service life. It must withstand abrasion, impact, attack from alkalies and detergents.

Recently, Westinghouse engineers adopted a greatly improved finish for Laundromat components, using a new *primer* based on Epon resin. Applied by flow coating, the primer is only one-third the thickness of previously used primers. Tests have established a *three-fold* improvement in coating durability under severe conditions . . . and application costs have been materially reduced. Some interior surfaces have *Epon primer as their only finish.*

If you need a protective finish like this in your paint program, ask your supplier for Epon resin-based paints and enamels. Write to Shell Chemical for the brochure "Planning to Paint a Pyramid?" on the variety of applications of Epon resins in surface coatings. Call on our sales offices for names of manufacturers who sell Epon resin coatings.

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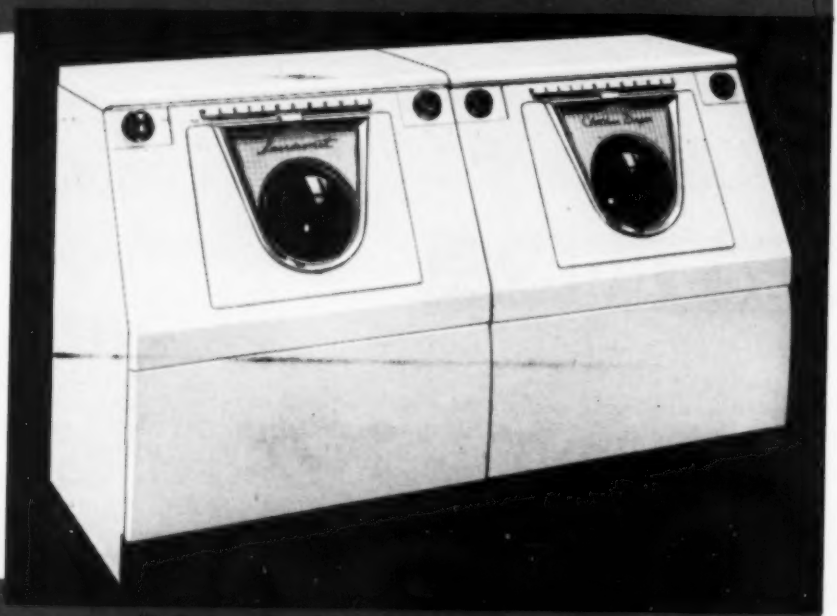

Westinghouse Laundromat Automatic Washer and Electric Clothes Dryer, painted with Pittsburgh Appliance Finishes.

PITTSBURGH

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Appliance Finishes

"TWINS" Looking New Longer!

BY WORKING WITH the technical and production staffs of leading manufacturers of household appliances, Pittsburgh has developed exceptionally high-quality finishes to meet a variety of performance standards.

Formulations, application methods, finishing systems and recommendations of materials often are based on the result of such joint observation of factory tests and performance of finishes on products in the field.

Typical of the results of such cooperative effort are the coatings used on Westinghouse's famous Laundromat "Twins"—automatic washer and electric clothes dryer. These high-quality finishes provide the utmost in durability and appearance. They not only add to the eye appeal of these products on the sales floor, but they assure the retail purchaser that they will *look new longer.*

Whatever you make—refrigerators, ranges, washers, dryers, ironers, freezers, hot water heaters, or roasters—Pittsburgh has the proper finish for you. Our experience can be helpful in saving you time and money. We'll be glad to have our engineers discuss your finishing problems with you at no cost or obligation. Write, wire or phone nearest plant listed below.

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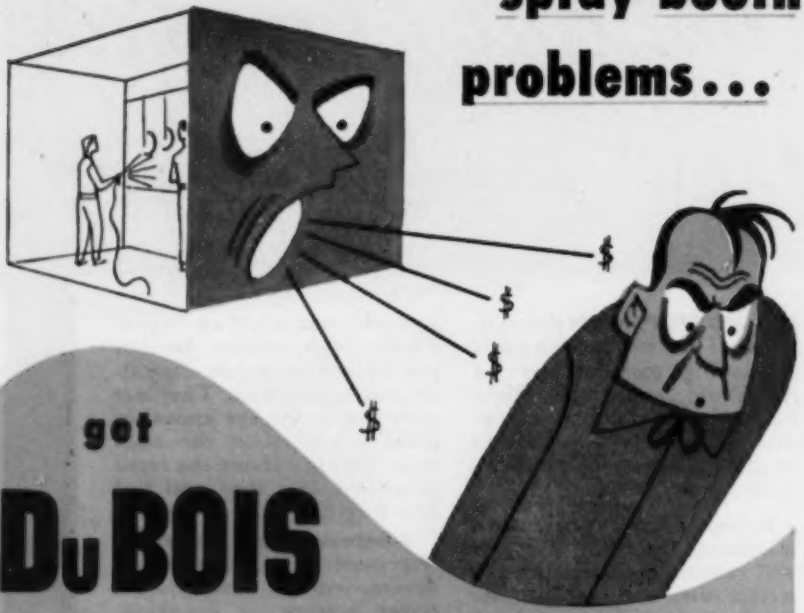
hot weather means spray booth problems...



get DuBOIS Engineered Maintenance Program

Actual case histories reveal that each spray booth, if improperly maintained, can cost thousands of unnecessary dollars due to clogged equipment, spoiled production, unreclaimable paint and preventable booth repairs. *DuBois Engineered Maintenance Program guarantees to cut costs* by eliminating these problems through analysis of your operation and the installation of prescribed specialized DuBois compounds:

- KLARIFIANTS . . . water-wash compounds that control overspray.
- FILMITES . . . coatings for dry areas of spray booths.
- PEEL FILMITE . . . flame-proof peelable plastic film.
- STRYPP . . . for periodic purging of old paint deposits in hydraulic system.

Contact DuBois today for details on this complete service.

FREE . . . spray booth maintenance check chart. Write for your weekly-monthly program for proper spray booth maintenance.

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Cincinnati 3, Ohio • Los Angeles 33, Calif.

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Ransburg Electrostatic Processes

Whether it be painting of automobile bodies —(in one case, saving $1.81 per body)—or painting smaller automotive parts, RANSBURG ELECTROSTATIC PROCESSES are accounting for substantial savings to the manufacturer, and to the buying public. *An accumulated savings amounting to several dollars per car!*

In various plants here and abroad, industry is relying upon the unmatched efficiencies of the Ransburg Electrostatic Processes to paint these automotive parts:

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AIR FILTERS • OIL FILTERS • SHOCK ABSORBERS • RADIOS • HARDWARE
STEERING WHEELS • STEERING CASTINGS • TIE RODS • RADIATORS
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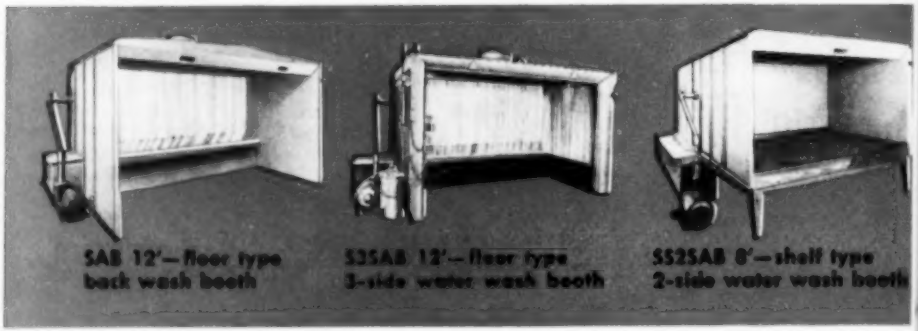
No More Paint Scum Trouble! Save Hundreds of Dollars in Cleaning and Maintenance Upkeep Expense Annually

Cut out costly shutdowns for cleaning. Eliminate lost production time while operator removes paint sludge. Paasche SELF-CLEANING units automatically collect all sludge and off-spray in a new Filter Unit. Saves up to $1800 per year in maintenance alone—depending upon booth size. Cleaning a Paasche water wash booth takes only seconds! 1) Take out sludge-filled filter bag, 2) put in clean filter bag. No time-cost wasted in messy scraping and cleaning of trough, tank or air and water distributors. Now you can save high-priced maintenance by using Paasche SELF-CLEANING water wash air finishing booths. Ask for bulletin ABE 5-54.

- **Sludge Removal In Seconds**
- **Eliminate Costly Shutdowns**
- **Better Fire & Health Safety**
- **Automatic Collection of All Sludge and Off-spray**
- **Conversion Units Available to Users of Paasche Booths**

World's Most Complete Line of Manual and Automatic Airbrushes Regulators, Compressors, Airconditioners, Dry and Water Wash Booths Ventilators and other Air Finishing Equipment.



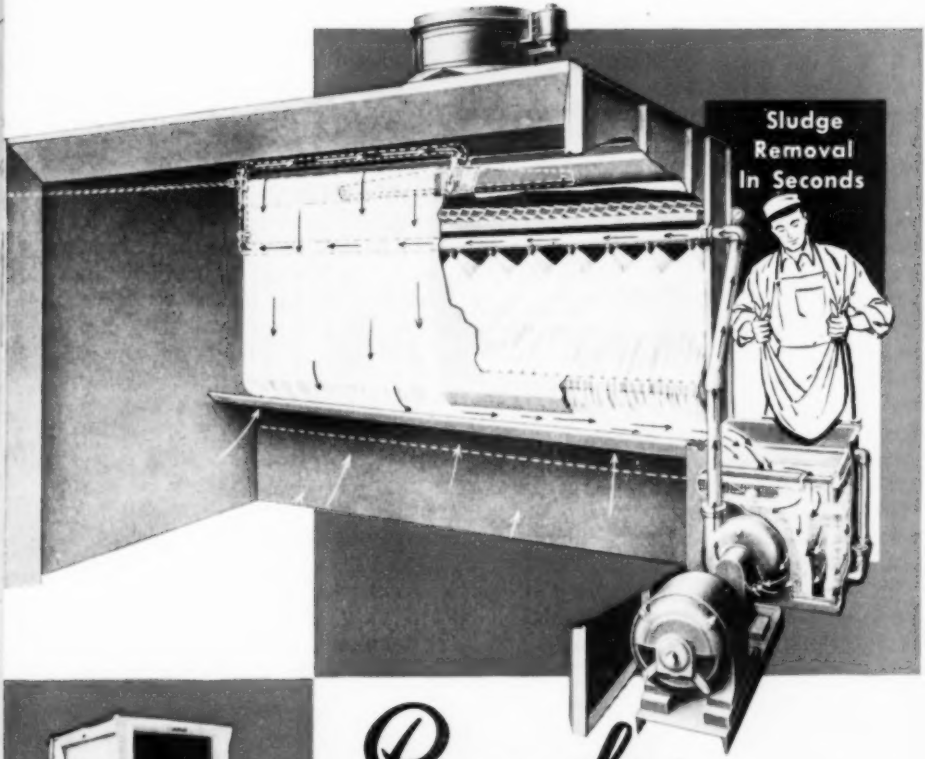
SAB 12'—floor type back wash booth

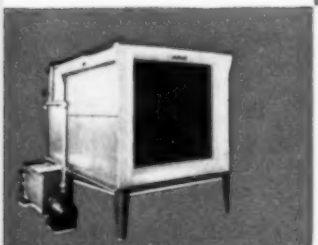
S2SAB 12'—floor type 3-side water wash booth

SS2SAB 8'—shelf type 2-side water wash booth

OF MAINTENANCE UP TO 80%

CLEANING
FINISHING BOOTHS





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HOW MANY
square feet per gallon?

BY J. P. GARDNER

WE are all sure that it is a very simple undertaking to find out exactly how many miles per gallon we get from our automobiles. We merely drive up to a pump, fill it up, and then calculate our miles per gallon. What we don't know, and never will know is exactly how many miles we get on a pull, down grade, up grade, at high speed or at low speed. So it is with industrial painting—except in this case we are competitive and we must have the correct answers. We should know which parts result in low efficiency and which parts result in high efficiency, at which point we should consider other methods, and what is happening presently among our competitors.

It is certain that we shouldn't go to our competitors for this kind of help, nor should we rely entirely on our suppliers to help us cut down the gallon volume used. We should rely on simple arithmetic and common sense.

Price Per Gallon Up—But Less Waste . . . . Less Cost

The time hasn't come yet when paint prices are generally on the down grade. For all practical purposes, as better paints are being developed and made available to us, the cost per gallon is still going up. This does not necessarily mean that we have to pay more per square foot to get our products painted. There is something happening in industrial painting and it is based primarily on a realization of how much paint industry has actually thrown away in the past 30 years. Millions and millions of dollars have been paid for millions of gallons of very fine paints, and it is within reason to say that something like half of it has been

Even with quality paint materials costing more per gallon, you can reduce your cost of product painting—but first, how high is your product painting efficiency? Your percentage of wasted material, time and labor? How much variation in film thickness on products you paint? Do you have facilities for making accurate measurements—and for calculating real costs?

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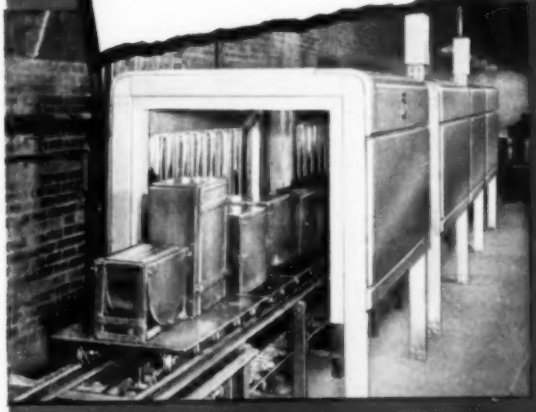

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thrown away. We will always have to waste some of it, but we should do something to reduce the amount wasted. One of the first things we have to know is exactly how much is being wasted.

A new era is here, due to what appears to have been a sudden realization that there are new methods now becoming popular which result in very high and previously unheard of efficiency. This all seems suddenly to tie in with the presently popular industrial automation programs. Perhaps it is a strange coincidence that the high efficiency methods seem to be the automatic methods as well. So why not take the hand labor out wherever possible? If we can do it, then we merely prove that labor has been wasted also.

Volume Production—More Possible Savings in Dollars

High volume production always lends itself to better study than low volume production because when we consider the dollars involved it is more fun to tackle a larger figure. Where high volume exists, standardization, automation, and high efficiency all go hand in hand. The field of available methods of painting, in large volume production, appears to have suddenly expanded.

Methods which have previously resulted in full hand labor and very low material efficiency are being replaced with full automatic methods, some of which are capable of reaching nearly 100% efficiency. The important factor most often found lacking, prior to the adoption of new methods, is experience and cooperation on the part of men in the contributing industries.

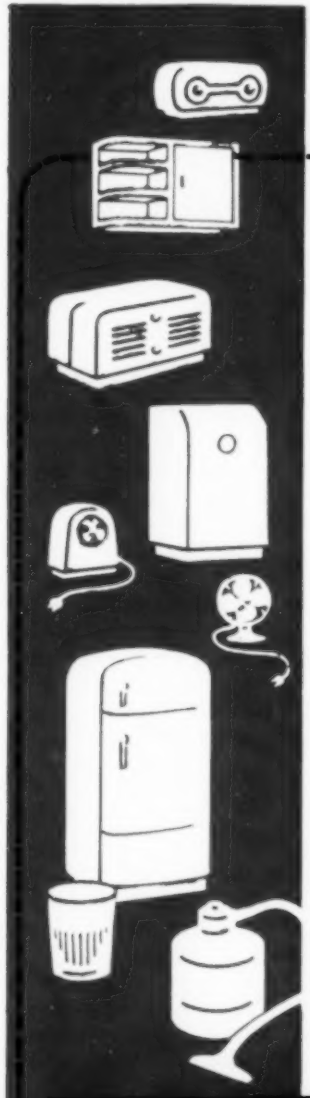
To Paint Automatically Controls Are Necessary

One of the most important factors in adopting automatic processes, and one often overlooked, is that more exacting controls are necessary. For example, if we can eliminate four sprayers and change from 10% material efficiency to 99% efficiency, we most certainly can afford to put a laboratory man and a control operator on the job —at least temporarily. Right about at this point, many industrial users have a fear that the finishing touch may be lost, so to speak. Those who haven't become scared, have discovered that it may be possible to get better appearance and better quality, and most certainly more uniformity with automatic processes, and they have gone ahead.

Percentage of Inefficiency Is Seldom Known Accurately

One of the greatest problems facing engineers who are trying to convince management of the advisability of adopting automatic processes is the lack of the horrible truth about inefficiency. Very often a cost department group provides all cost and efficiency data without once considering the actual and accurate theoretical coverage of their unmixed gallon of paint. There are many formulas for such calculations.

Each paint supplier and each industrial user has his preferred method for calculating his theoretical coverage. It is safe enough to assume that a supplier is going



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to give a fairly accurate figure of mileage, especially if it is to be compared with the user's method of mileage calculation.

The theoretical coverage figure for a gallon of paint, thinned or unthinned, is *the area which it is capable of covering at a given thickness of film, without waste.* The usual variable for industrial paint material unthinned, barring decorative paints, is between 500-sq. ft. and 700-sq. ft. per gallon, per mil of film thickness. Comparing this with an actual figure realized in production can be truly amazing.

What methods are being used to determine the actual coverage? As in the case of the automobile mileage remarks, how does this film thickness vary from inside to outside, from top to bottom, behind flanges, etc.? We don't really know until we take the trouble to make some really accurate calculations. After all, film thickness variable is a quality variable also. Many a process has been turned down due to an estimated film variable, when actually the process in use resulted in an unknown insofar as this variable is concerned.

Uniform Film Thickness All Over Coated Areas

We need more accurate methods, or at least we need to pay more attention to actual mileage measurements. Too often we get an easy answer as to what our actual film thickness and our resulting efficiency is, compared to the theoretical possibilities of the material.

Let us take an instance where a metal cabinet was prime coated by hand spray. A written specification stated that the film thickness should be between 0.8 and 0.9 mils. A suggestion was made to flow coat the part, but the idea was rejected because it was felt that the flow coat method was not capable of meeting the specification so far as film thickness tolerances were concerned. Samples were prepared by both methods, and each part was unfolded and carefully measured.

The sprayed part showed underflange areas which had no coating at all, due to the inaccessability. The sprayed part also showed a thickness of 1.5 mils on a low inside corner. This then adds up to a variable of from zero thickness to 1.5 mils for the hand sprayed part. The flow coated part was measured and found to have a minimum of 0.4 mils at the top and 0.9 mils at the bottom. In other words the hand method had a film thickness variable of 1.5 mils and the automatic method had a variable of only 0.5 mils.

All of this is still only half of the story. We still want to know the actual efficiency in terms of mileage, or the average film thickness. Remembering that between 0.8 and 0.9 was specified, the average had to be found for each process. It was necessary to make 200 careful measurements on each part. The hand sprayed part showed an average film thickness of 0.9 mils while the flow coated part showed an average film thickness of 0.75 mils.

The more important point to consider is that in the automatic process, with properly exercised

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controls and because of the uniformity in automation, only spot checking is necessary after a film thickness average has been determined. In any hand operation there is piece to piece variation.

Accurate Measurements Will Tell True Story

The accuracy of measuring instruments should be considered too. The quickest methods may suffice for inspection spot checking. For actual determinations of average film thickness to calculate actual mileage, instrumentation should be carefully selected. The magnetic type gauges, of course, can only be used on the proper metals. When they are used, great care must be exercised in selecting the proper film thickness standards, and similar metal surfaces should be used when calibrating the instruments. If a top to bottom or a side to side average film thickness is desired, a piece of aluminum foil fastened to the surface before painting and then measured with a micrometer is an acceptable method. This method is used in the wood finishing trade successfully.

It should be stressed that the uniformity accompanying automatic application processes actually provides the only means for accurate recording of paint mileage. Hand operations vary from piece to piece and frequent film thickness studies are necessary. Presently there are some automatic application processes which are completely panel controlled to include paint temperature, paint viscosity, work temperature, and work area temperature control. It is not always advisable however to use a one day calculation, even on an automatic process. For example, if the process is flow coating, there would most likely be at least 175 gallons of paint involved. If the quantity of paint used is five gallons per hour, it would be relatively difficult to measure accurately the amount of paint left in the tank.

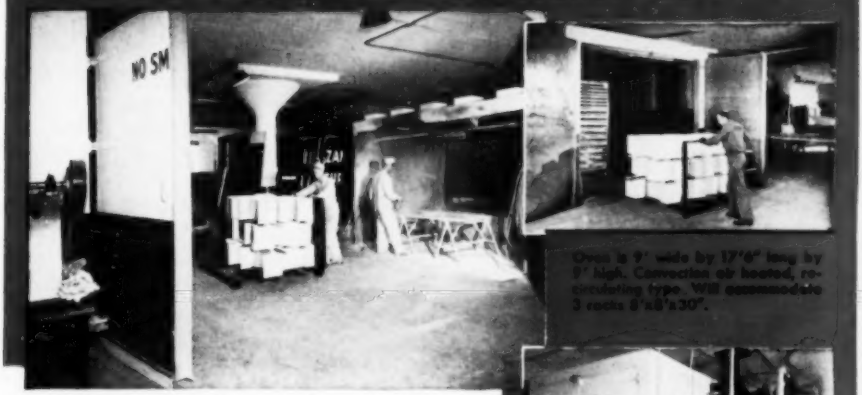
Efficiencies of 10% to 99% .... High Ones Get More Study

In making these studies of efficiency we may find ourselves studying processes with efficiencies ranging from 10% to 99%. Strangely enough, it appears that the high efficiency methods receive a great deal more study attention than the low efficiency methods. Some of the resulting efficiency figures are quite misleading and also quite inaccurate. For example, a job where the user dreamed he had been getting approximately 50% efficiency from hand spray, was converted to automatic and, by using the same efficiency calculation formula, he found that he was getting 200% efficiency from the new process.

Sources of Possible Error In Calculations

Another source of error has been through paint manufacturers' claims that much less film thickness is required with particular paints, thereby resulting in higher efficiency. This is positively incorrect. The efficiency has nothing to do with the square feet of surface covered unless the theoretical coverage of equal thickness is the opposing factor. Actually, it should

DESPATCH OVEN TRIPLES SIGN PRODUCTION AT NAEGELE ADV. CO.



Despatch Water Wash Spray Booth cleans paint laden air . . . removes vapor laden fumes . . . eliminates most of labor and "down time" for cleaning.

The progressive Naegele Advertising Co., Minneapolis recently "at home" in greatly enlarged quarters, is creating and producing painted bulletins, highway and commercial units of all types faster than ever before. Production increases of 3 to 4 times were realized when, for finish baking, the company replaced infra-red light banks with a Despatch Finish Bake Oven of the double-end opening, batch type. Quality also is greatly improved because the oven produces a much harder paint finish. Operating at a controlled temperature of 250° F., the signs are baked for ½ hour on the prime coat and each succeeding color coat of enamel. Using lights, the drying time for similar work required 4 to 5 hours. Now 300 to 400, 3′ x 8′ bulletin panels are run per day while under previous methods only 80 per day were possible.

In conjunction with the oven, a Despatch Water Wash Spray Booth is employed. It measures 12′ wide, 8′ deep with 6′ added extension panels. Water curtain is operated by a 480 GPM circulating pump.

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be left to the user to determine his proper film thickness requirements. He may want film thickness to accommodate texture and opacity, as well as protection. Some application methods produce better thin films or more continuous films than other methods.

As previously stated, theoretical coverage estimates have a wide range. There would be some confusion if we were to expect to get 500-sq. ft. of painted surface from a gallon of wrinkle enamel, having a theoretical coverage of 750-sq. ft. per gallon per mil of film thickness. It just can't be done because the formed film texture must be more than a mil thick in order to form a pattern.

Some users base their estimated square footage of metal surface to be painted on total part weight. This would include average metal thickness used. Using this as a factor would certainly not result in a usable efficiency figure. Some parts are fabricated by spot welding and while only small areas of metal are overlapped, the aggregate could most certainly throw us way off on painting efficiency calculations.

Each painting method, whether hand or automatic operating, has a mileage characteristic. What we must know is the extent to which we obtain the available efficiency of any selected process. The process selected is based entirely on the product being painted, and the end use of that product should always be given first consideration. When we have achieved the highest possible efficiency of the process in use, controls should be applied to assure continuing economies.

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CLEANING AND CONDITIONING

METAL SURFACES FOR COATINGS

By P. C. BARDIN, Associate Editor

Metal cleaning and surface treating, in preparation for the application of organic coatings, have been developed to such a degree that it is now possible to economically process any metal product, regardless of what is on its surfaces. Choice of methods, materials and facilities will depend upon the product and individual plant conditions, plus the volume and speed of production that are wanted.

[PAGE 80]

BEFORE ANY PRIMER, mist coat or single coat of paint, varnish, lacquer or synthetic enamel is applied to the bare metal surface of any part or product, that surface must be thoroughly cleaned. Otherwise there is likely to be lack of permanent adhesion of the coating to the metal. After a coating is applied to an unclean surface, there may follow such troubles as slow or uneven drying, blistering, flaking, peeling or discoloration.

"Start with clean metal," is the first rule of metal finishing and painting. Experience with the performance of various coatings on metal shows the wisdom of this vitally important Rule No. 1.

Metal surfaces may become soiled and smudged with dirt, oil, grease, perspiration or other contaminants at the mill or foundry, during shipment and storage, and in the course of machine work where partial or complete fabrication takes place.

Purpose of Metal Cleaning And Surface Preparation

The purpose of metal cleaning and surface preparation is to clean the surface, prevent corrosion and increase the adhesion of applied organic coatings. The term "metal products" includes both ferrous (iron and steel) and non-ferrous metals (aluminum, brass, bronze, copper, zinc, nickel, tin) and may include anything from a ballpoint pen cap to a Diesel locomotive.

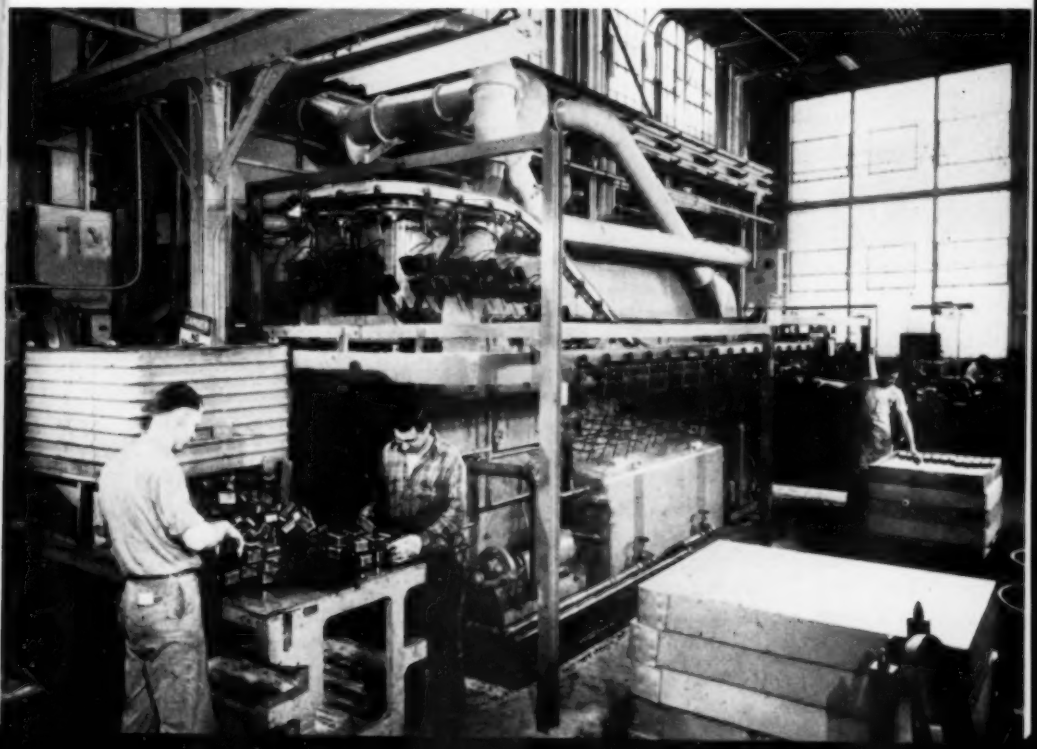
Obviously, with so large a field and with such wide divergence of materials, end use and life expectancy, no specific rules can be laid

down except to say that in every case the metal surface must be clean before any coating is applied. By what method the surfaces are cleaned and to what extent surface preparation is carried depends upon the size and shape of the parts, the type of soil to be removed, and the end use of the product.

Alkaline cleaners are used in power spray washers, in dip tanks and sometimes in hand brushing or wiping operations. In each case, cleaning with an alkali solution is followed by a water rinse. Power spray washers may have from two to five or six stages, but alkaline cleaning treatment occurs only in the first stage of the procedure. These machines are usually conveyorized, either by continuous conveyor that carries the parts through the washer and on to subsequent painting and other operations, or by a conveyor that operates within the washer only. [*To page 32*]

In many new installations the metal cleaning and surface conditioning facilities are "tied in" with equipment for applying and drying or baking the protective or decorative coatings put on the product. Here two men at the left are loading racks with small parts; these racks are being hung on the lower level conveyor which is moving them into and through the cleaning, phosphating and rinse operations.

Clean parts move through a drying section, then through the paint dip tank and finally rise to a higher level where they pass through the paint baking oven. Parts can be seen emerging, by conveyor, from the oven directly above the entrance to the wash and rinse section. Parts then dip down and are unloaded at floor level by an operator, as shown at the right hand side of this picture.



What method and equipment will be used depends upon the amount and nature of the soil, the size of the parts or products to be cleaned, and the volume of production. In some cases the quantity and nature of the soil may demand that the product be immersed in a tank to clean it properly.

In tank cleaning one of two methods can be employed—the still tank or the tank in which the cleaning solution is agitated. Certain types of soils may be removed by simply immersing the product in the cleaning solution. Other types of soils require a slushing action of the cleaning solution—mechanical stirring or agitation produced by the injection of compressed air into the tank of liquid.

In emulsion cleaning the same equipment is employed as in alkali cleaning—and the methods followed are generally the same.

Acid Solution Cleaning—Its Characteristics and . . .

Certain types of soil found on cold rolled steel may be removed by treatment with phosphoric acid-based cleaning solutions. These solutions are useful for removing light rust caused by exposure between fabrication and finishing. Quite recently cleaners have been introduced which do three jobs at once: 1) Clean surfaces of such soils as stamping and forming oils, rust preventive oils, carbon smuts, soldering and welding fluxes, and identification inks; 2) Remove rust, heat scale, tarnish and other oxides; and 3) Etch steel, cast iron, aluminum sheet and aluminum castings, and coat them with a microscopically thin film of insoluble phosphates which substantially improves paint adhesion. These cleaners contain, in addition to phosporic acid, surface active agents, and sometimes organic solvents.

The high acidity of such cleaning solutions precludes any substantial phosphate deposit on the metal surface, however. The film they leave will weigh from 5 to 10 milligrams per square foot, while the coatings produced by phosphating solutions will weigh from 100 to 4000 milligrams per square foot.

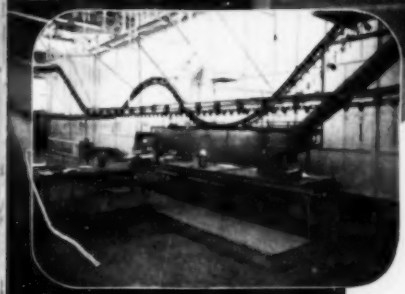
Application by Brushing, Swabbing or Dip Tank

The phosphoric acid-based cleaners are generally used in either tank or hand application. In the former, concentration will run from 10% to 50% by volume with water, and the solution may be heated to 140° F. or above for better cleaning. The metal part in process is immersed for the required period of time, and then rinsed and dried.

In application by hand, the concentration may vary from 5% to 50% by volume with water; the solution can be swabbed or brushed on the surface. It is permitted to soak for one to ten minutes; then it is rinsed off and the surface is allowed to dry.

These solutions are generally applied by hand when the parts are too large for a tank, or when production is limited, or when only a few spots must be precleaned before another cleaning operation. When the volume is large and the production rate demands fast cleaning, the job may call for a pressure spray application. It must be remembered,

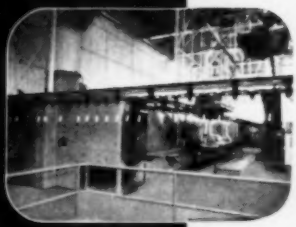
Dual Cincinnati FINISHING SYSTEMS

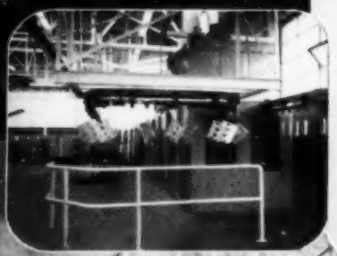


AUTOMATIC PAINT DIP and CHROMODIZER OPERATIONS:

1. Alkaline Clean
2. 1st Rinse
3. Passivate
4. 2nd Rinse
5. Hot Air Blow-Off
6. Paint Dip
7. Oven Bake
8. Stripper
9. Rinse

For empty conveyor hangers.





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A double conveyor line cleaning and paint finishing system in a well known mid-western aircraft plant handles all sorts of formed aluminum parts up to 15" x 20" in size. Moving at 18 feet per minute, the conveyors carry the parts through the various operations, removing grease, oil and chips prior to painting and assembly.

Among interesting design features: The arrangement of the system around the outer perimeter of the room, leaves the center clear for storage and loading and unloading operations. The zinc chromate dip tank has a refrigeration system to maintain tank temperature at 74° F., reducing evaporation of volatiles. The system is protected with CO_2 equipment and automatic paint tank dump.

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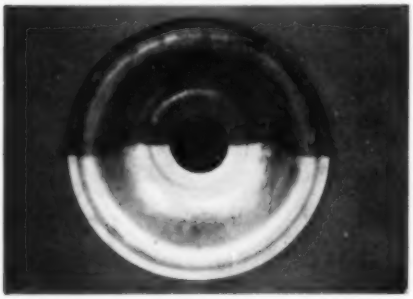
however, that such acidic solutions demand special corrosion-resistant equipment.

Steam Spray Cleaning for Some Special Jobs

For some metal products too large and heavy to be run through a metal washer or through a series of dip tanks, and where the contaminants on the surfaces are too heavy to permit convenient or economical hand washing or hand brushing, steam cleaning may be the answer. In this method of cleaning, a hot detergent, especially adapted to removing the particular soil from the surfaces, is applied to the work through a steam spray gun under pressure.



Surfaces must be clean before they receive any protective or decorative coating.

Cleaning is accomplished quickly and effectively by the action of a hot detergent solution sprayed under pressure. Heat softens any oil or grease that may be present, while the detergent provides the chemical action as a wetting agent and emulsifier. After cleaning, the soil is rinsed off the surface by closing the detergent solution valve on the gun and applying only steam or hot water. Nozzles to spray flat and round patterns are available.

More recently phosphate coating products having detergent properties are coming into usage by application through steam guns. The advantage here, of course, is not only to provide the normal cleaning and soil removal from a metal surface, but at the same time to phosphate coat this metal surface for more effective paint adhesion and resistance to corrosion.

Manual Washing with Cleaning Solvents

Cleaning metal products by hand washing with naphtha, paint reducers and hydrocarbon-type solvents is still employed in some plants. However, this method and the materials used have several weaknesses. First, the operation is slow. Second, being a hand operation, its effectiveness depends entirely upon the personal care and skill of the operator who does the work.

Third, the solvent being used, soon becomes loaded with the oil and grease it removes and, unless clean solvent is substituted frequently, solvent washing will merely spread a thin film of unwanted oil all over the metal surface being washed. Fourth, the use of these solvents creates a fire hazard. Finally, these solvents do not remove rust; they do not provide a corrosion inhibiting surface, and they do not etch the surface of the metal to increase paint adhesion.

Solvent Vapor Degreasing And Variations

In most vapor degreasers, where chlorinated hydrocarbon solvents (generally trichlorethylene or perchloretheylene) are used, the parts

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Liquid Stripper #6 is Safe—no fire hazard, no odor, no fumes, non-toxic • Liquid Stripper #6 is Sure—parts are fully cleaned—metal surface is unharmed—long life is assured—economy is proven • Liquid Stripper #6 is Soluble—converts paint film to soluble form which can be rinsed off with a water spray—contains no chemicals which cannot be flushed through sewers.

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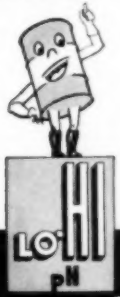

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pioneers in pH cleaning control serving you since '32

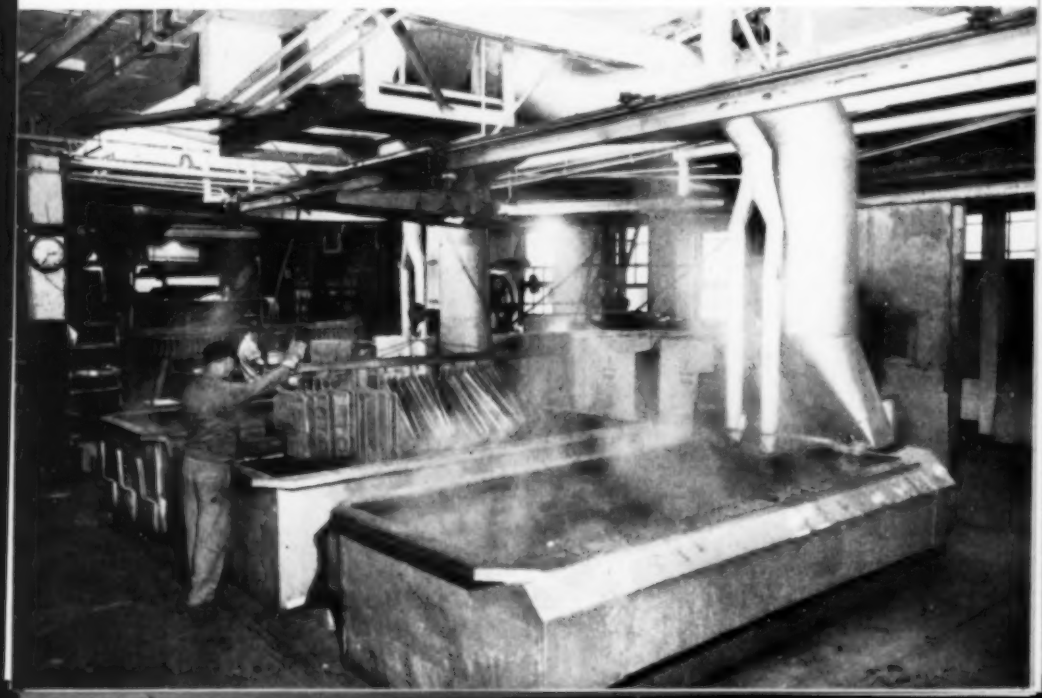
or work to be cleaned are lowered into a vapor zone. Here the surface oils, grease, etc., are washed off with oil free solvents which rapidly condense on the surface of the metal. Regardless of how contaminated the heated solvent becomes, only oil free solvent vapor ever contacts the parts being cleaned, therefore no thin film of oil is spread over the metal surfaces.

Soil removal by vapor degreasing depends more on solubilizing than on mechanical action. Because of this, coupled with the fact that condensation is dependent upon a difference in temperature between the vapor and the metal (and the temperature of light gauge metal rises rapidly), at least three or four types of solvent-vapor degreasers are available and in service.

First, we have the immersion degreaser wherein the product is lowered into boiling solvent to remove heavy contamination, then into clean solvent to rinse and cool the metal, and finally into the vapor zone to complete the cleaning and heat the metal so that its surface dries at it leaves the vapor zone.

For removing all traces of color buff from plated work or bright metal such as a cigarette case or a compact, a vapor degreaser is often the logical choice because it eliminates the water spotting and drying problems which exist when water solutions are used for metal cleaning. [*Continued on page 38*]

Close-up of cleaning, phosphatizing and rinse tanks, with overhead rail and traveling hoist by which racks of pressed steel parts are lowered, lifted and moved from one tank to another according to the required sequence of operations.



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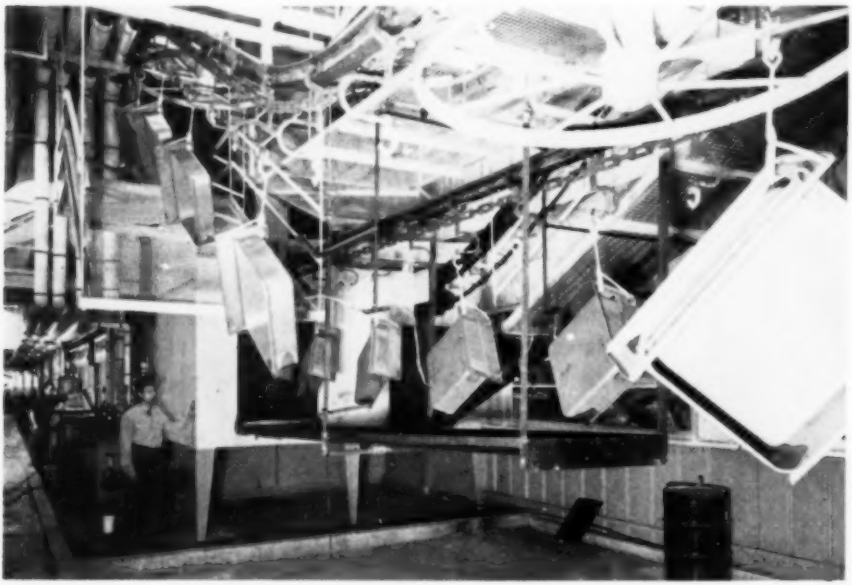
Vapor Slush . . . and Vapor-Spray-Vapor

Second is the vapor slush degreaser which is similar to an ordinary vapor degreaser except that it has a pump, hose and nozzle with which the operator sprays or flows solvent over the work to remove insoluable soils before the parts are completely cleaned in the vapor zone. Also, the flowing of cool solvent over thin gauge metal parts help to keep them cool so that the vapor will more readily condense on their surfaces.

Third is the vapor-spray-vapor degreaser where the work is first wet with solvent vapors, then solvent is pressure sprayed over the parts, and finally the work enters a vapor zone for complete cleaning and drying of all metal surfaces. This type of degreaser is always conveyorized either by a continuous overhead chain, or by self contained metal belt or cross bar conveyor.

It is possible to conveyorize all solvent vapor degreasers if the nature of the work and the volume of production makes this desirable. Solvents used are non-inflammable, which eliminates any fire hazard, and they may be used on both ferrous and non-ferrous metals without harm to the metal. The surface of vapor cleaned parts is sufficiently dry so that no follow-up drying is necessary.

Depending upon the quality and type of soil to be removed, the cleaning of metal products in a vapor degreaser may result in a



Cleaned parts, on parallel conveyors, leaving the six-stage power washer. The conveyors double back and carry the rinsed parts through dry-off ovens on the second level up.

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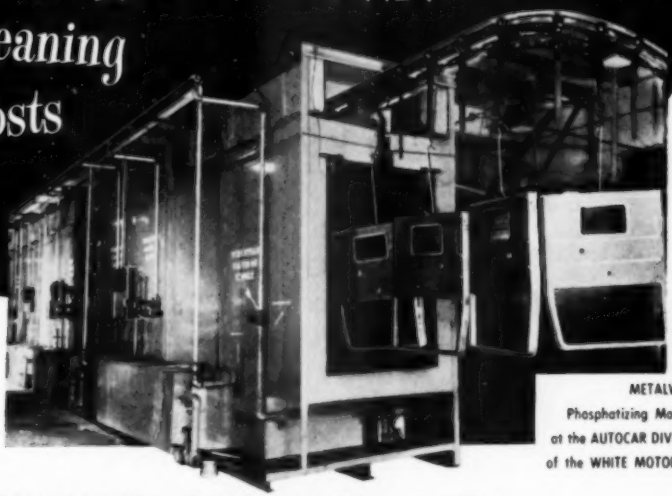

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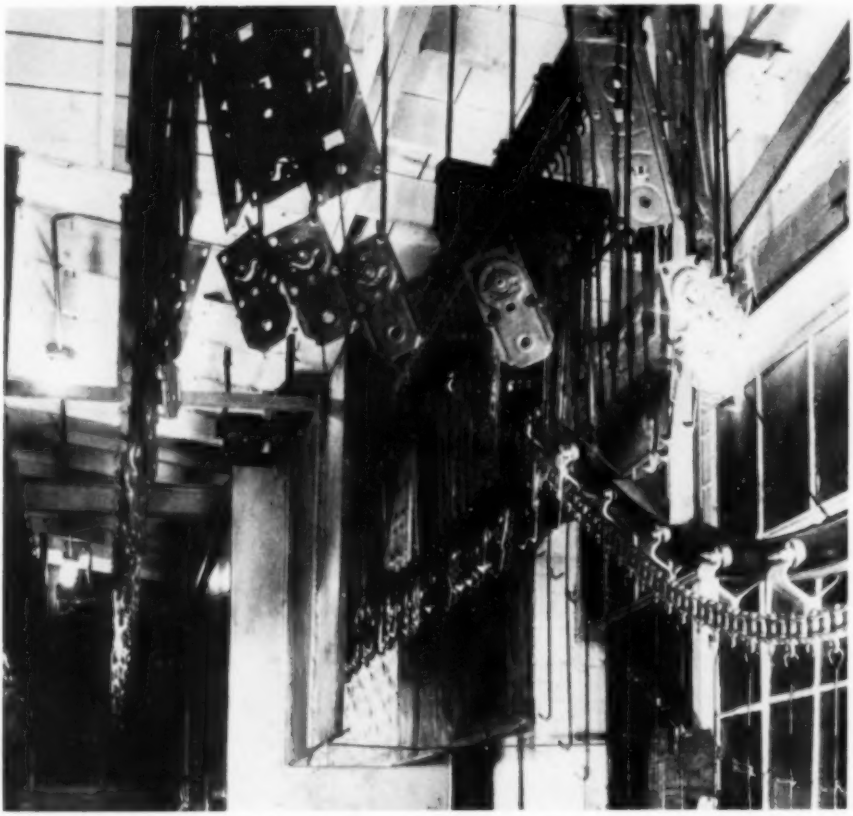

Metal parts entering and leaving an infrad degreasing oven by overhead conveyor.

slight residue being left on the surface. This residue does not seem to have an adverse effect on the adhesion of paint or lacquer coatings that are applied later. However, for certain products that must have a mirror like finish, it may be advisable to wipe off this residue before any finish coating is applied. Examples include costume jewelry, compacts and cigarette cases; these products are vapor degreased and then given a protective coat of clear lacquer or clear synthetic material. Vapor degreasers are engineered and built so that no appreciable vapor fumes escape.

Thermal Degreasing in Burn-off Ovens

Thermal cleaning (using a burn-off oven) is adapted to certain types of metal products. The burn-off process, as it is generally called by shop men, is quite simple. It is accomplished by placing metal products in an oven where the temperature of the metal (not necessarily

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the oven temperature) is rapidly raised to as high as 650° to 700° F. [not always this high however] for a few minutes. During this period (usually from two to five minutes by electric infra-red) the temperature of the metal is raised above the volatilization temperature of the surface oils and grease, consequently these soils are virtually vaporized.

The burn-off process is especially effective in volatilizing the oils in lapped joints, seams and recesses. When the surface oils and grease are sufficiently heavy, a slight carbon residue may result from the burn-off process but this does not seem to have any harmful effect on the adhesion of subsequent organic coatings. However, for an extremely high quality finish on certain very fine products, the surfaces could be carefully wiped with a tack rag before any coating material is applied.

During the burn-off process thin sheet iron and sheet steel surfaces may assume a blue color similar to that on a blue steel gun barrel. This oxidation, when it occurs, penetrates the metal slightly and provides a temporary rust-inhibiting surface, as well as a good base for the film of paint. By a "temporary rust-inhibiting surface" I mean that the product is not likely to rust in the usual short period of time between cleaning and painting. The term should not be confused with the insoluble phosphate coating that forms on metal surfaces as a result of treatment in a series of dip tanks or in a multi-stage washer. The phosphate coating offers a continuing inhibition to corrosion, even after the finish coating is applied.

Many of our sheet metal products are adaptable to cleaning by the burn-off method. Burn-off ovens may be heated by gas, oil or electricity.

Thin gauge sheet metal parts heat quickly and cool off quickly. An element to consider is the possibility of certain parts or products warping if the heat is not uniformly applied to them, or if it is too high, or if it is continued too long. Some experimenting may have to be done to develop accurate information in reference to this feature, as it might affect certain products, although most experienced oven engineers are in position to offer dependable suggestions and advice on the subject.

Blast Cleaning—A Form of Dry Cleaning

Blast cleaning — formerly referred to as sand blasting, abrasive blasting, shot blasting, etc.—is a type of "dry cleaning" wherein one or more powerful sprays of dry abrasive or shot are directed against the metal surfaces to be cleaned. The force used to drive dry abrasive through a hose and nozzle is generally compressed air, but in some blast cleaning machines the centrifugal force of a specially designed rotating wheel hurls the stream of abrasive with sufficient force to do the job satisfactorily.

The principle of blast cleaning is adaptable to a variety of work. A typical factory application is to remove rust, shop smudge marks or old paint from iron and steel castings. The castings are placed on a large revolving table or on a flat-bed conveyor which moves them

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through a blast cleaning cabinet. After one trip through the machine, the castings may need to be turned over to expose the under side to blast cleaning during a second trip through the cabinet.

In other applications men dressed like deep sea divers work in a blast cleaning room where they direct a pressure spray of dry abrasive through a hose and nozzle to the castings being cleaned. Compressed air carries the abrasive through the hose and propels it with great striking force against any surface toward which the nozzle is pointed.

In much smaller blast cleaning cabinets a single part to be cleaned is held in the operator's rubber-gloved hand and thrust through a flexible opening in the cabinet where it is moved and turned to different positions while a shower of abrasive beats against it from one or more directions.

Blast cleaning is also applicable to the cleaning of very large work such as railroad cars, busses, trucks, etc. This work is generally done in a large tightly closed room in which the elevator scaffolds extend parallel to the car or truck on both sides. Operators wearing inhalators and shields over all the exposed parts of their bodies stand on the elevator scaffolds to direct the spray of abrasive or shot against metal surfaces of the car. The soil and rust or old paint are removed by the spray of abrasive or shot that is driven by compressed air.

The resulting surface shows bright and clean and is lightly etched to form a base for paint; it is suggested, however, that this surface be further treated, if possible, with some phosphoric acid base product, or phosphate coating product, to further passivate the surface and to provide an element of resistance to corrosion or oxidation. Bright clean iron and steel surfaces, unprotected and exposed to normally moist air, begin to rust quickly —often before they can be moved to the paint department and given a protecting prime coat.

One source of information on this subject advises that the surfaces of "articles to be blasted should be free of oil, grease or water in order to avoid 'balling' of the abrasive."

With dry blast cleaning there is naturally no follow-up drying involved, as there is in wet cleaning. Of course, blast cleaning is not necessarily limited to dry blasts of abrasive or shot; water or a chemical solution or steam may be included with the spray of abrasive or shot if desired, and this is done in some instances.

Choice of Cleaning Method Is Important

Now, with so many different methods, materials and facilities available, the question naturally follows: "Which shall be used to accomplish a definite purpose?" Several factors can influence one's choice of methods, materials or equipment to use for cleaning metal surfaces. Sometimes the initial investment is the deciding factor; sometimes it is the floor space available, or it may be some specification requirements, etc. A wise choice will take into consideration such specific reasons as the type, kind, shape and size of the product; the particular type of soil to be re-

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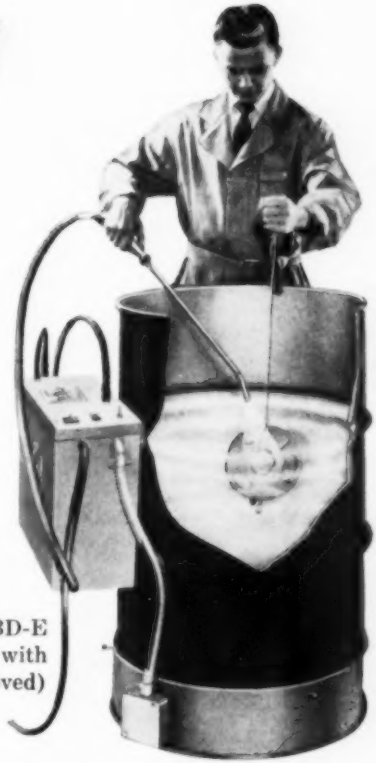

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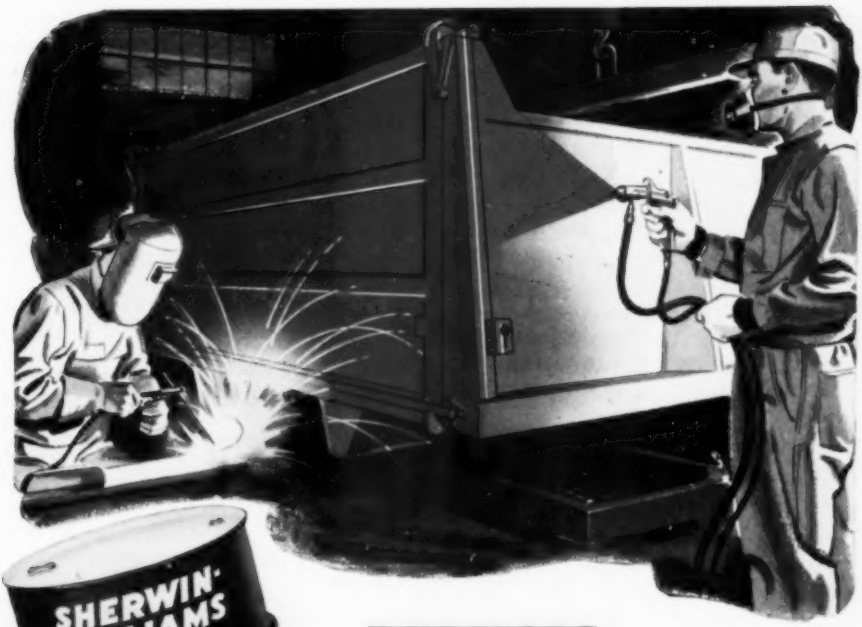
moved; potential volume of production, and whether or not the end use and life expectancy of the product demands a rust-inhibiting phosphatized base for its subsequent coating of paint, lacquer or enamel.

Multiple-Stage Power Washers Often Used

Where the optimum in corrosion resistance, by phosphatizing, is required a five or six-stage metal washer is recommended. Five or six-stage washers are generally used in the treatment of automobile bodies, refrigerator cabinets and like articles, where the finish requirements are high. Where the quality requirements are not so high, such as in metal garden furniture, or in some metal office furniture and articles of a less enduring nature, or articles which are not subjected to severe climatic or humidity conditions, many manufacturers find that metal washers that have only three or four stages of operation are quite sufficient and satisfactory for their requirements.

Now as to soils, some drawing compounds congeal on contact with hot alkali solutions, therefore this type of oil or grease may have to be removed by a vapor degreaser. Drawing compounds that are high in a soap content which is insoluble in a vapor degreaser, must be cleaned in an alkali solution. Where rust is present and where only light soil has to be removed from metal

Small parts, some in trays, others in mesh boxes, moving through 3-stage power washer.



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products of moderate size, a phosphoric acid and solvent cleaner would probably be used.

What Phosphate Coating Accomplishes; Its Value

On products that must have definite protection against corrosion, as well as lasting adhesion of the paint film, the surface is usually given a phosphate coating. Correctly applied, the phosphate film effectively prevents electro-chemical corrosion under paint and increases adhesion of paint to iron, steel, aluminum, cadmium, and zinc surfaces. It prevents the spread of rust in case the finished product is deeply scratched or marred.

Thin phosphate films (60 to 90 milligrams per square foot) increase the adhesion of paint so that metal products may be bent and formed after the finish is applied. Examples include venetian blind slats, bottle caps, crowns, closures and "tin" cans.

The extent to which rustproofing needs to be carried will depend upon specification requirements based on the use and life expectancy of the product.

Types of Coatings and Their Applications

Application method and weight of resultant coating will depend upon which type of phosphate treatment is selected.

The zinc-iron phosphate coating is generally produced by the action of acid zinc phosphate solutions, plus accelerators, on ferrous metals. The film is produced by the combination of zinc from the solution with iron from the metal. Application is usually by spray machine for 1½ to three minutes, or by tank immersion for three to five minutes. Weight of the coating will vary from 100 to 4000 milligrams per square foot, with the heavier coating being formed in the immersion tank. The zinc phosphate treatment is adaptable to use on all surfaces of products containing such different metals as aluminum, cadmium, zinc, iron and steel.

Zinc phosphate coatings on zinc, zinc plate, cadmium, or galvanized surfaces are produced by similar solutions. They are usually applied by spray or dip for two minutes or less, and the coating ranges from 75 to 200 milligrams per sq. ft.

Aluminum surfaces may be phosphated with an aluminum-chromic phosphate solution, applied by brush, spray or dip, for periods ranging from 20 seconds to five minutes. The coating is amorphous, and weighs from 20 to 200 milligrams per square foot.

One of the most popular treatments today is iron phosphating. Economical in use, this type of coating is usually applied in pressure spray washing machines, although for some metals (zinc die castings, for instance) tank immersion is recommended. Treatment time varies anywhere from one to five minutes.

A particular advantage of the complex, thin, iron phosphate treatments is that their mild acidity makes it possible to incorporate cleaning properties in the solution. Precleaning of the parts is not required unless the soils are heavy. Only one solution is used in the washing stage of the machine to

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both clean and impart the phosphate coating, which weighs from as little as 45 milligrams to as much as 150 milligrams per square foot.

What Takes Place in Three And Five Stage Washers

Three to five-stage washing machines are generally used for this purpose. In the three-stage machine the steps are: 1) Wash and phosphate; 2) Overflowing water rinse; 3) Dilute chromic rinse.

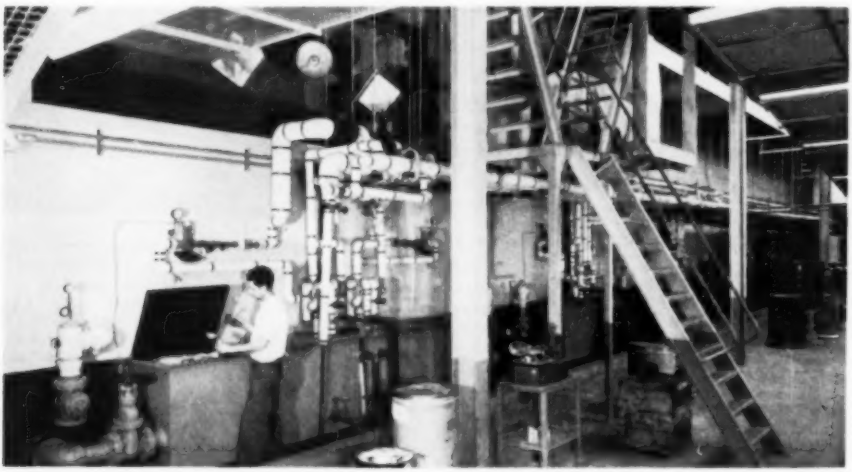
When heavier soils are to be removed, and heavier coatings are desired, a five-stage machine is generally used: 1) Preclean with an alkaline or acidic solution, depending upon the nature of the soil to be removed; 2) Rinse with clean, overflowing hot or cold water; 3) Phosphate treatment; 4) Cold overflowing water rinse; 5) Chromic acid rinse.

The chromic acid rinse, following the phosphate treatment, completely neutralizes alkaline residues in the water supply and removes the last traces of unreacted phosphating chemicals, and improves resistance against the corrosive effect of moisture.

Phosphating problems which have been presented by surfaces too large for immersion in tanks or spray washing machines, have been solved by applying phosphate cleaning solutions through steam guns. The surfaces are simply sprayed thoroughly with the solution, then rinsed with steam alone. This method has been used on tank turrets, locomotive cabs and hoods, and tractors.

Phosphatizing Mixed Metals Through Same Line

Now in some plants where mixed production prevails, it is possible to obtain phosphatizing solutions that are compatible to both ferrous and non-ferrous metals. For certain



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types of work, it is possible to treat, quite effectively, both ferrous and non-ferrous metals in the same washer and with the same material. However, where the manufacturer requires the optimum performance, say on a refrigerator cabinet of cold rolled steel, then it is advisable to use a phosphatizing solution or treatment that provides the best results for steel.

Similarly, where another manufacturer may want the optimum performance on aluminum alloys, as for instance on aluminum house siding, then it is best for that manufacturer to use a product designed and formulated to give the very best performance on aluminum alloys alone.

But at the same time, there are manufacturers processing both steel and aluminum through the same equipment and same material, and where the very optimum performance requirements are not essential. An illustration of this would be a manufacturer of bus body seats, theatre seats and like equipment, composed of both steel and aluminum alloys. Such a manufacturer has found that a product capable of treating both steel and aluminum alloys simultaneously, in the same equipment and the same material, has proved to be effective and satisfactory for his particular type of requirements.

Call in an Engineer for Careful Consultation

Usually when any new setup or improvements in an existing installation are contemplated, the smartest thing to do is to call in an experienced and competent engineer from one or more well known responsible companies. Show him your products and all of the facilities you have available, and explain what future changes may occur or what changes you might want to provide for. With a complete knowledge of all of the facts relating to your present and foreseeable future production setup, this technical engineer and his company will be in position to plan and furnish you a wise choice of perhaps two or three economical and efficient cleaning installations which will give trouble-free service.

This choice of a product cleaning installation is too important, in every way that it affects your business and your products, to let your decision be over emphasized by a little knowledge or guess work or a hunch or some personal quirk, or by what your neighbor is using or plans to use.

Insist upon getting all of the facts as they relate to your products and facilities. Along with the performance and probable length of useful life of equipment, you will have to consider several costs—first cost, operating cost, maintenance cost, floor space cost, handling cost as a result of the installation, and insurance cost, etc.

Remember this: When you see a metal cleaning installation working so smoothly, efficiently and economically, there is more to it than meets the eye—past and present. In all probability the background of that installation includes some firm's and perhaps several engineers' years of experience, technical knowledge and pride of workmanship. Long after the first cost is

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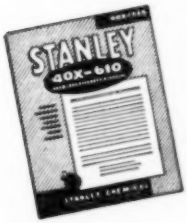
Now steel or iron parts can keep the weather at bay throughout a year of outdoor storage without topcoating. Reason: Stanley 40X-610. This one-package, one-operation wash primer for spraying, brushing, or dipping forms a weather-tight skin that lasts. Its resistance to corrosion and rust creep is excellent. And Stanley 40X-610 may be used with most topcoats. Find out more about this low-cost, easy-to-apply outdoor protection . . . write today for the new bulletin on Stanley 40X-610 to: Stanley Chemical Company, 41 Berlin Street, East Berlin, Connecticut.



LACQUERS

JAPANS

SYNTHETICS

ENAMELS

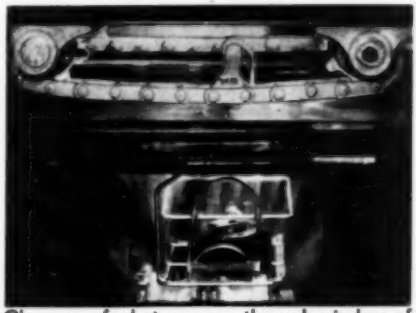
STANLEY CHEMICAL

forgotten the installation continues to function as planned and promised in the beginning.

Soniclean Process (Ultrasonic) Uses Sound Waves

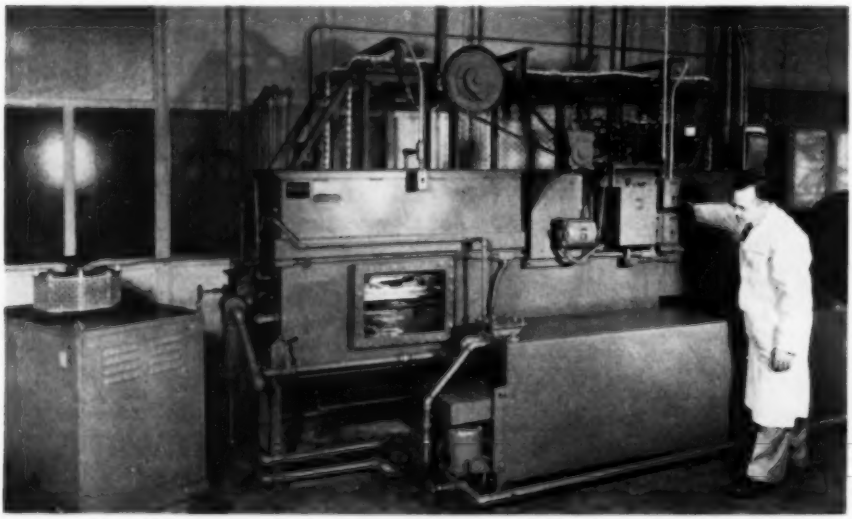
The Soniclean Process of cleaning metal includes the use of sound waves (ultrasonic—pitched higher than what can be heard by the human ear) in combination with the correct degreasing solvent to produce the ultimate in precision metal cleaning. It is especially adapted to perfection cleaning of very intricately machined and formed parts of any non-absorbent material — metal, glassware and molded products.

Electrical energy is transmitted to transducers in the cleaning solvent, converted into sound energy, and projected through the cleaning



Close-up of what you see through window of Soniclean machine cleaning intricate parts.

fluid at a frequency of about 430,000 cycles per second. The cleaning solvent used is generally trichlorethylene; however, the process is not limited to this material. Because a potential of only 40 volts is needed to operate the transducers, they can be safely immersed in the solvent. The sound energy utilized in this metal cleaning pro-



Here is a modern conveyorized Soniclean machine in operation, cleaning hydraulic valve bodies. Notice the convenient window through which you can see what is going on inside.

Reduce Man Hour Loss

"Kerodex" Gives New and Improved Barrier Protection Against Contact Dermatitis

"Kerodex" is a new and improved barrier cream which offers maximum protection against hundreds of primary irritants and sensitizing agents encountered in industry. It provides an effective protective coating which is invisible yet strong and as elastic as the skin itself. It protects against initial contact. It prevents the recurrence of a dermatitis after recovery.

Special Advantages

"Kerodex" offers practical and effective protection *before* the damage is done. It is nonirritating and nonsensitizing. It may be applied with equal safety to the face, hands or any other area of the skin, keeping pores and follicles free from foreign matter.

"Kerodex" does not smear. It does not affect materials handled, nor is it affected by them. It is easy to apply, economical and highly acceptable to the user.

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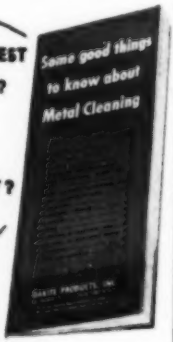
"Kerodex"® is supplied in two types, and a series of creams are available to protect against: *water-soluble* irritants such as acids, alkalis, soaps, detergents, and *water-insoluble* irritants such as paints, enamels, cleaning fluids.

Write for Information

We'll be happy to send you complete descriptive literature, or to have our representative call at your convenience.

Ayerst Laboratories, 22 East 40th Street, New York 16, N. Y.

WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11
WHAT'S THE MOST ECONOMICAL WAY?
See page 9



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answers many questions that mean better production, more profit for you. Just look at the table of contents:

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Machine cleaning methods
Electrocleaning steel
Electrocleaning nonferrous metals
Pickling, deoxidizing, bright dipping
Pre-paint treatment in machines, in tanks and by hand
Paint stripping
Steam-detergent cleaning
Barrel cleaning
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cess is above the audible range of 20,000 cycles per second and is defined as ultrasonics.

Parts to be cleaned are placed in the solvent, either manually or by conveyor and moved directly into the path of greatest focal intensity of ultrasonic waves. In this area an extreme turbulence is created, resulting in a deep and penetrating cleaning action which removes, almost instantly, all dirt, grease, chips and microscopic particles of soil from even the most intricately shaped and close-fitting parts.

First commercial equipment employing the Soniclean Process is now in operation at the Electric Shaver Division of Remington Rand, Inc., Bridgeport, Conn. It is fully conveyorized and is used for the precision cleaning of shaver heads at a rapid rate of speed.

In cases where exceptional cleaning quality is required or where parts have fine openings (even the inside of a hypodermic needle), crevices and other hard-to-clean forms, the Soniclean process is claimed to be rapid, economical and safe for modern industrial use.

Author's Acknowledgement: This is a revision of my article published in the November 1951 issue of Industrial Finishing. In preparing this revision, valuable added paragraphs were supplied, along with other welcome suggestions, by Neilson Chemical Co. and Oakite Products, Inc. Others who have contributed valued help include Baron Industries; G. S. Blakeslee & Co., Cincinnati Cleaning & Finishing Machinery Co.; Detrex Corp.; Industrial Chemical Products Co.; Industrial Systems Co.; Klem Chemicals, Inc., and Northwest Chemical Co.

This assistance is very much appreciated; I believe it has helped to make the article more accurate and complete.

New Shop Colors Helped Production; Safety

THE SUPERINTENDENT had heard about the beneficial results of dynamic painting, as it is known. When he got the green light from management to try it, the color experts were called in.

First they worked out a color code for the machines in the finishing department: green for the non-critical parts; cream for critical parts; red for controls; orange for the electrical system. A paint crew went to work on the machines. Formerly dull surfaces now had big areas of soft, restful green, interspersed with a light, airy creamy color and spiked with gay touches of red and orange.

With less eyestrain in the brighter surroundings there was less fatigue, and everyone felt better at the end of each day. By making workers more safety conscious, focusing their actions and minimizing fatigue, dynamic painting helped to lower the accident rate. (The department's best previous safety record stood at 1,027,000 manhours without a lost time accident. Since the addition of color the mill has set a new record of 4,858,579 manhours.)

Dynamic painting was extended into other parts of the plant and workers learned to live with color in their lives. They don't want it any other way.—*Steelways.*

American Air Filter Co., Inc., has purchased the Ice Cooling Appliance Corporation, Morrison, Illinois.

Circo Vapor Degreasers use 30% less solvent

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New, modern Circo vapor degreasers — whether large or small — are engineered to save on solvent consumption. Construction features like balanced condensing coils, leak-proof pumps and dual vapor-level control are today saving companies 30% and often more in solvent use. Circo degreasers perform faster, save precious man-hours through engineering designs developed through 30 years experience in vapor degreasing.

Circo Introduces Ultrasonic Cleaning

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ENGINEERED FINISHING SYSTEM ...Meets Difficult Requirements

BY P. C. BARDIN

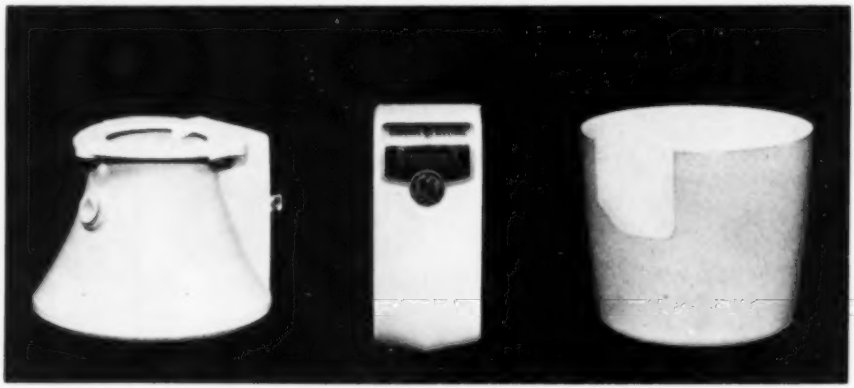
THIS IS THE STORY of real pioneering in modern finish application. Can a single coat of white enamel be applied by flow coating, at drum solids and viscosity, on a food waste disposer that will pass General Electric Co. Major Appliance Division specification demands?

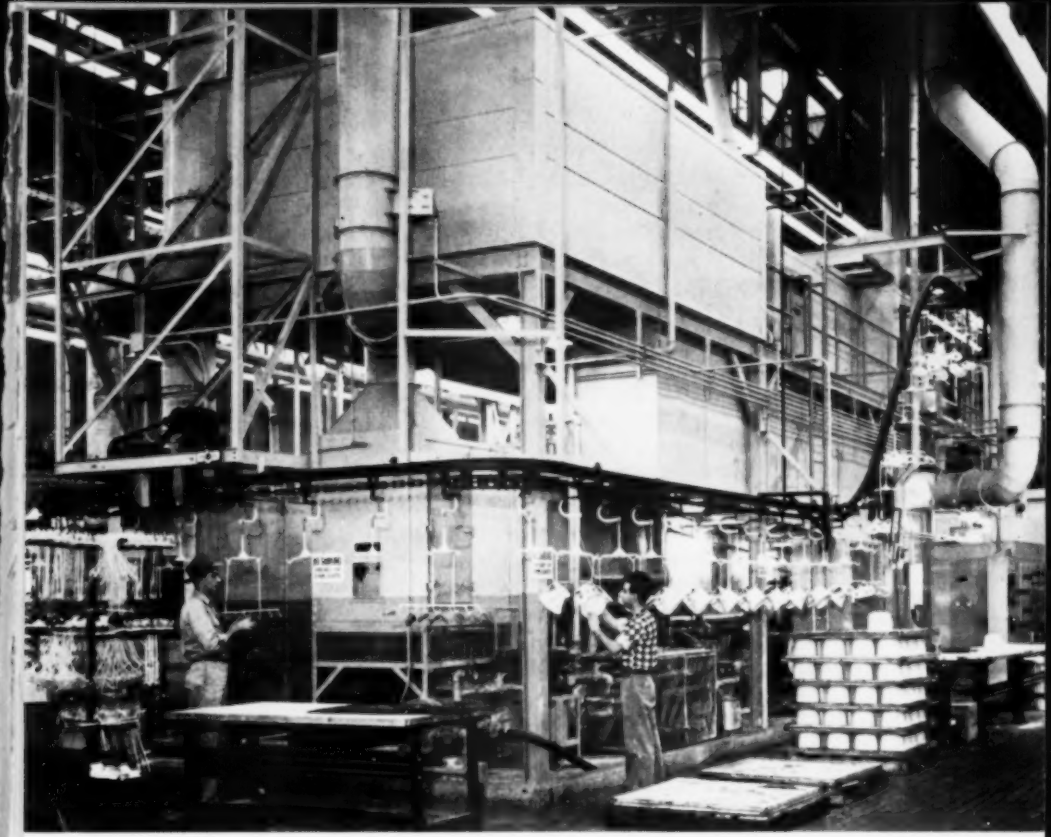
"Impossible!" might have been the answer several months ago. But this result has been accomplished. It wasn't easy. It was developed through the concerted efforts, persistance and technical skills of experienced men in G.E.'s Major Appliance Division laboratory and manufacturing plant, technicians with the supplier of enamels, and engineers with the equipment manufacturer.

The entire system was worked out on a pilot installation in the laboratory of the enamel supplier. It is now in regular daily production on a full size unit in the General Electric Co. plant at Appliance Park.

The purpose of this research and development was to improve the quality of finish and to reduce its cost substantially at the same time. There are two ways in which this can be done. One is to reduce the labor personnel required to prepare for and apply the finish, and the other is to cut to a minimum any waste of coating material. Due to the complexity of the parts, the logical solution appeared to be low pressure flow coating as a means of paint application.

The three principal parts of food waste disposers that require a white protective coating.





Here is the complete equipment—the power washer (including phosphate treatment) at lower left, flow coater in lower center and baking oven above. Control panel appears far to the right. Parts leaving the oven descend by conveyor to the unloading station in foreground.

Quality of Finish Improved In Four Ways

The quality of this new finish has been improved in four ways as compared to the old finish. 1) Phosphate treatment has been added to prepare the surfaces for painting. 2) Complete inside and outside coverage is obtained. 3) A baked enamel finish is used instead of an air drying lacquer. 4) The general appearance of the unit has been greatly improved.

Through savings in labor and coating materials, and including the four listed improvements in quality, the use of low pressure flow coating has resulted in a substantial cost reduction for painting these food waste disposers. What is perhaps of greater importance, this research has opened the door for many similar projects.

The various parts of the food waste disposer are coated before assembly. Three prime factors are involved in flow coating these parts. 1) The complicated contour of some parts. 2) The coating material. 3) the equipment. Let us consider them in order. [*To page 60*]

The painted parts for this food waste disposer consist of a base casting, a cover, a control cover and other small accessories. The covers are smooth surface round pieces of drawn steel which offer no problem in flow coating. The top casting with its complicated contour is far different. This casting offered the real problem in successful flow coating because of sharp radii, inverted corners, drain plugs, tapped holes and the flange gasket surface.

Prior to using the flow coat method, the inside surface was only partially painted by hand spray before the unit was assembled and later finished. For the same reason none of the surfaces were phosphatized. The cycle consisted of assembly, hand wash and spray one coat of white lacquer to produce a film thickness of .003-in.

The present cycle consists of running the parts through the 6-stage power washer where all surfaces are washed and phosphate coated, dry-off oven, cooling zone, flow coat, drain, bake at 285° F. and assemble. Coating the inside of the unit completely offers protection from the washing action and abrasives normally encountered in use.

Paint Was Developed With Help of Pilot Installation

In pilot installations in the various paint suppliers' laboratories, nine different materials were studied. Most of them proved to be unsuited for this method of application on these particular parts.

One enamel maker concentrated on developing the right kind of material and ascertaining the proper relation of ingredients, solids, viscosity, timing in solvent vapor drain tunnel, baking time and temperature. A white synthetic, melamine alkyd resin base material seemed to be the right type for coating these units, because of the baking temperature limitations, and other conditions that could not be changed. The enamel finish had to have the following characteristics. It had to:

1) Meet G.E. Standard white in color and gloss.
2) Be a baking enamel.
3) Have good alkali resistance.
4) Have abrasion resistance.
5) Have good color retention.
6) Withstand the machining of certain parts after finishing.
7) Cure at a maximum temperature of 285° F.
8) Leave no sags, bubbles, pinholes or blisters, especially on the flange gasket surface.
9) Cover solidly from top to bottom, with uniform film thickness.
10) Leave no bare or thin edges, no heavy or piled up areas.
11) Withstand handling during assembly without damage.

This is quite a large order. The answer did not happen as though by magic. After selection of the material has been made, frequent changes in the formulation and in solvents were necessary during the experimental work.

High Solids, High Viscosity Paint . . . at 80° F.

In the pilot study, experiments in flow coating were started with enamel at a low viscosity and low solids. As development work progressed, both the viscosity and the solids were gradually increased. No heating of the paint was used in

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Possibly we can help you to reduce your painting costs, too. Our experimental flow-coating machine is available, without cost or obligation.

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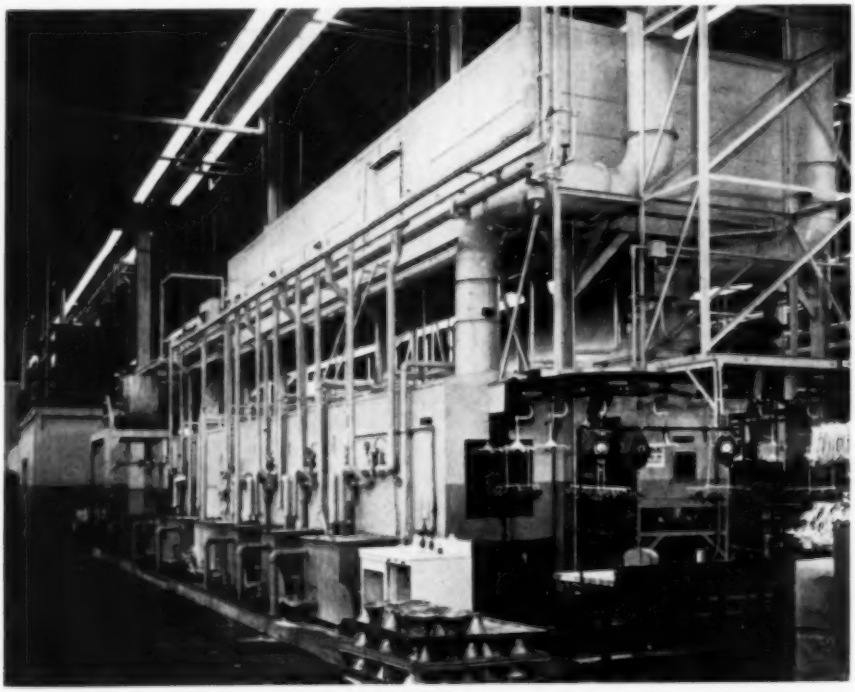


Racks of small parts are entering the 6-stage power washing and surface conditioning equipment. All solutions are titrated every half hour at the lab table in right foreground.

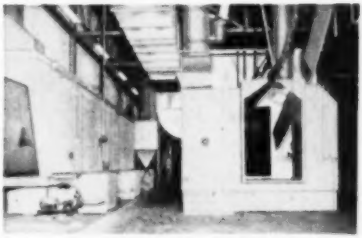
the early test runs. Later, technicians determined the proper baking time and temperature which would produce the best possible finish on waste disposer parts.

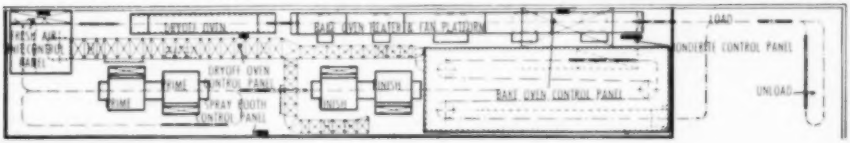
Only through all of these experiments was it discovered that, for successful flow coat application, a definite control of the viscosity is necessary throughout the year, regardless of room temperature. Research indicated the use of the enamel at a viscosity of 170 seconds at 75° F., as measured in a No. 2 Zahn cup, with 68% solids to be suitable.

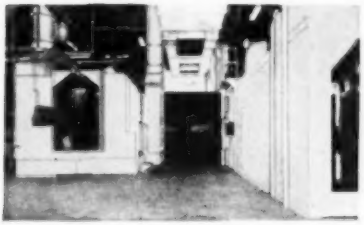
The temperature of this enamel, when in use, is controlled throughout year at 80° F. to produce a working viscosity of approximately 135 seconds. This is accomplished by circulating the enamel through thermostatically controlled heat exchangers during the cold months, and through the same exchangers under refrigeration in hot months.

It should be of interest to list briefly in tabular form, some of the difficulties encountered in the pilot study, and the corrective steps taken. Reference is indicated by similar numbers. [*To page 64*]

Room Conditioner Manufacturer Builds Plant in Deep South...Chooses Complete Peters-Dalton Paint Finishing System







Specialized Engineering —Backed By Experience

The rapidly expanding Room Conditioner field requires more manufacturing capacity. To meet these requirements, one manufacturer constructed a new plant in Alabama. When planning the plant layout, utmost consideration was given to installing the best and most efficient equipment. For the complete paint finishing operations, Peters-Dalton, Inc. was chosen. Illustrated here is a small part of this Finishing System—it was designed and installed by P-D engineers.

Space saving was of great importance, and layout for the practical flow and handling of parts and finishing required complete understanding of the manufacturer's needs. These were solved by P-D engineers. The system they installed is now functioning smoothly . . . and efficiently handling production requirements at minimum cost.

Hydro-Whirl Paint Spray Booths *Industrial Washing Equipment*
Drying and Baking Ovens *Hydro-Whirl Dust Collecting Systems*

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Difficulties

1) Bubbles.
2) Aeration in pilot equipment.
3) Solvent washing on sharp radii.
4) Pressure sensitive masks on holes falling off.
5) General sags on certain areas.
6) Heavy beads and last-drop stringing.

Corrective Measures

1) Improved solvent balance and better vapor control during drain period and flash-off time.
2) Relocation of dampers; more dampering to reduce air flow.
3) Higher viscosity to increase hiding power and better vapor drainage control.
4) Eliminating use of pressure sensitive masks through the use of self-tapping screws.
5) Redesigned hangers to hold parts, and modified damper control.
6) Changes in formulation and solvents, and reduced air flow in drain tunnel.

Good Pilot Equipment Helped Observation of Performance

For experimental purposes the pilot equipment must be well engineered. Makeshift equipment, haphazardly assembled, should never be used. Time and space are powerful factors in any finishing system. The production equipment must be scaled to the pilot installation; and it must include such flexibility that it will be possible to produce a specification finish on the product. Obviously the pilot equipment must be designed within the possible limits of the production equipment. All of this was quite simply and easily accomplished in the enamel development laboratory, after carefully considering each factor and its influence on the final finish.

Furthermore the equipment must be designed to embrace the following three important factors: 1) Continuous, unfailing control of the coating material as to the viscosity, solids content and temperature. 2) Proper solvent balance in the tunnel during flow-off and drain period. 3) Correct, positive hanger design. Without these the operation will never be successful.

More Features of Coating Equipment Now Being Used

The production flow coater for the waste disposer is a 2-tank unit having one enamel tank, and one solvent tank. The 175-gallon per minute circulating pump, operated by a 10-hp. motor, can withdraw material from either tank, circulate it to the risers or manifolds, to the nozzles, to the product, and return through a sump to either tank. This makes it possible to clean the manifolds or risers, the walls of the flow coat machine, and the flow-out tunnel drain board with solvent, and return this solvent to solvent tank.

A 75-gallon per minute pump, operated by a 5-hp. motor, continuously agitates the enamel by pumping it through filters, through the heat exchanger (cooler in summer) and back into the supply tank. This pump can also be used to charge or discharge either tank to paint drums.

The flow coater has four manifolds or risers—two on each side, 4-ft. high, with a total of 48 nozzles made of $\frac{3}{8}$-in. inside diameter

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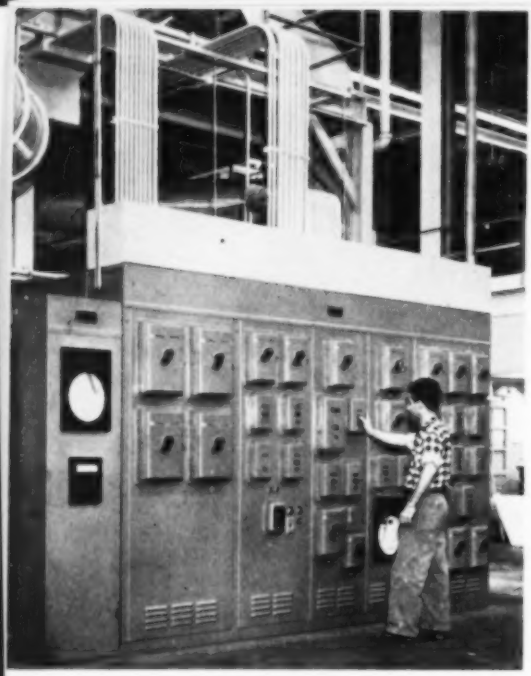

Front of control panel to finishing system.

aluminum tubing 4-in. long, located so as to completely cover the parts with a liberal application of enamel.

The solvent vapor drain tunnel is 34-ft. long. With a conveyor speed of 4-ft. per minute, parts travel in this tunnel for 8½ minutes. The concentration of solvent vapor of the right type and the time the work is exposed are very important items. Connected to and actually a part of this vapor area is another 34-ft. long tunnel which is ventilated. The amount of ventilation and the control of air currents by proper dampering is extremely important. Parts pass through this tunnel for 8½ minutes to provide a suitable flash period before they enter the bake oven, where the finish is cured for 30 minutes at 285° F. Approximately 125-cubic feet per minute of air is exhausted from this tunnel. This volume of air varies with conditions, but in any case the exhaust is properly dampered to prevent cross currents or turbulents of air.

In this system approximately two gallons of enamel are used to coat 350-sq.ft. of surface per hour. The dry film thickness is about 1.5 mils. The solvent loss is only 0.6 gallon per hour.

There is a lesson to be learned here. Through teamwork a finishing system has been developed which is something better than 98% efficient. This proves how vital it is that the user, the paint producer and the equipment manufacturer work closely with each other, with due sympathy and regard for each others problems. By giving a little here, and taking a little there, materials, equipment and other conditions can be brought into harmony, so as to produce the desired results.

Editor's Note: Companies that worked on this research and development with General Electric Co., Major Appliance Division, were Reliance Varnish Co., and George Koch Sons.

Detroit Representative Named by Jones-Dabney

R. V. Probeck has been appointed sales representative for the Detroit area by the Resins and Chemicals Division of Jones-Dabney Co. A 1947 graduate of Purdue University, Mr. Probeck has been with the firm's Louisville office since Nov. 1948. He succeeds E. M. Deane who has been transferred to Cleveland.

Neilson Opens Warehouse at Allentown, Pennsylvania

Eastern customers of the Neilson Chemical Co. are now being served from a new warehouse at Allentown, Pa. The warehouse will help speed deliveries and lower freight costs on shipments of metal cleaning, conditioning and phosphatizing materials to some 600 Eastern customers.

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REDUCES FINISHING COSTS!

with Absolute Quality Control

- ★ **Spray 2-Coats In One**
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Application is conveyorized..... turntable..... mobile..... other.....
Average volume of material per gun per hour.....
Type of material..... Please have representative call.....
Name .....
Company .....
Address .....
City ..... State .....

Force Drying Wood Finishes

THE FORCE DRYING of wood finishing materials includes many problems that involve the producers of finishes, the users of these materials, and the manufacturer of force drying equipment.

Since one of the purposes of finishing wood is to enhance its beauty, stain is used to produce a decorative and marketable color, and to accentuate the grain pattern. Porosity of the wood determines whether or not it needs to be filled. Very porous woods such as mahogany, walnut and oak require a highly-pigmented, heavy-bodied filling material. Semi-porous woods such as maple, birch, gum, etc., or nonporous woods, such as pine and fir, require less or no filling.

The least porous woods are usually stained by a highly colored pigmented stain which is wiped into the small pores. As its application would indicate, it is called a wiping stain and serves to both stain and fill the small pores of wood. With the very porous woods, the stain is usually applied separately and before filling. These stains are usually dyes dissolved in water (water stains) or in solvent (non-grain-raising stains). Filler, like the wiping stain, is wiped or padded into the pores.

As we all know, wood is composed of fibrils.

Surface fibrils will tend to stand on end as a result of the wiping action employed in the application of stain and filler. In order to make it easy to remove these protruding fibrils properly, a sanding sealer is applied. This sealer embrittles the

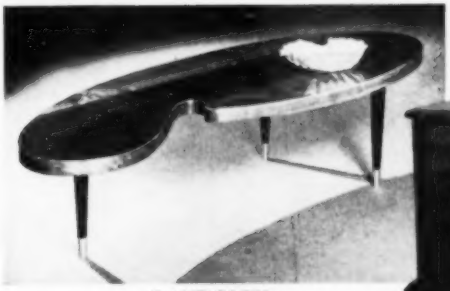
BY K. R. BROWN

Director, Varnish-Resin Laboratory, Sherwin-Williams Company

What processes are involved or included in drying the different finishes used on wood—evaporation of solvents: oxidation; polymerization—and what temperatures, humidities, air movement and time periods are required in the heat tunnels or ovens to properly force dry these various coatings rapidly, efficiently and economically.

SETH BEN-ARI, head of SETH BEN-ARI INC., Scotch Plains, N. J., internationally known designer and producer of furniture originals, has this to say about RANDOLPH WOODWORKING FINISHES:

"The choice of the right finish for custom-made furniture is the important, concluding step of an exacting job. We use Randolph Finishes because they give our work the final touch of perfection required by our high standards."



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Clear Rubbing Wood Lacquer 4703
is an ideal finish
for this modern coffee table.

RANDOLPH
Water White Clear Wood Lacquer Y8012
was selected for
this French provincial dresser

Randolph FINISHES

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There is an equally fine Randolph finish available for your product, whether it is made of metal, wood, plastic or fabric. You can get prompt action on your finishing needs by writing us today!

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PRODUCTS COMPANY
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protruding surface fibers so that when sanded they are cut off clean, leaving a smooth foundation for the finishing coats. Finishing coats are put on in sufficient thickness to provide the desired depth of appearance, satisfactory protection, and a film that can be subsequently rubbed and buffed if this is specified or desired.

The hollow cell structure of wood allows it to absorb and release moisture. Any sudden change of moisture content usually has dire results on the wood or on structures made thereof. For this reason the relative humidity in drying rooms or ovens must be at a level to prevent sudden and severe loss of moisture from the wood. The high relative humidities required are in conflict with those factors that contribute to the best drying of finishes.

This property of wood not only requires humidity control but limits the temperatures at which force drying of wood finishes can be carried out. Practical experience has shown that heat above 150° F. causes moisture change at a rate so rapid that checking of veneer, cracking of wood, delamination of plywood and loosening of glue joints can occur.

Several types of finishing materials are required to properly surface, decorate and protect wood surfaces. These types embody all of the three major processes that finishing materials undergo in the drying.

1. Evaporation of Solvent: All of the conventional finishing materials are thinned to working consistency by suitable solvents. In order for a film of material to become dry this solvent must be removed. In some cases, as with lacquers or dye-type stains, evaporation of the solvent is the only process involved in drying. In other types of materials, such as wiping stains, fillers and varnishes, solvent evaporation is only the first stage of drying, and must be followed by one or both of the other processes.

2. Oxidation: Many finishing materials in use today contain vegetable or animal oils as the film-forming or "flexibilizing" ingredient. These substances dry by oxidation; that is, in their original states they are liquid or semi-solid in nature. In such state, satisfactory continuous films are not formed. They are converted to solid continuous films by reaction with oxygen from the air. Oleoresinous and alkyd type varnishes must utilize this drying process, since they include oils in combination with resinous materials. Fillers, being essentially pigmented oils, also dry by the oxidizing process.

3. Polymerization: This term refers to chemical reactions which tie together many molecular groupings to form long chains of the chemical building blocks. In the "mono" form a chemical is liquid or soft compared to the "poly" form. In other words, as the molecular weight (or the number of molecular groupings tied together) increases, the harder, more insoluble, more chemically resistant a compound becomes.

This process takes place only after the molecules are sufficiently activiated. They can be thermally excited by heating or they can be

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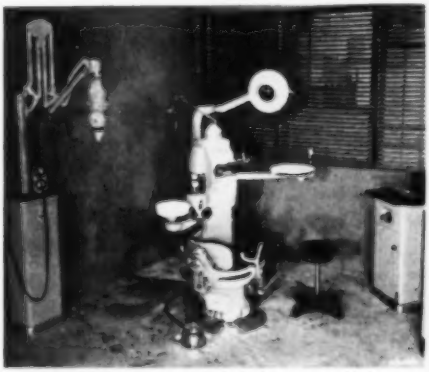

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chemically turbulated by catalysts. With wood finishes of the polymerizing type, molecular agitation can be accomplished by a combination of both means. Heat-converting varnishes are of this type. Polymerization is also involved with oxidizing type materials, since oxygen serves to cross link the oil molecules.

Table 1 will show how most of the wood finishing materials employ combinations of these three drying processes.

Table 1—How Finishing Materials Dry.

	Evaporation	Oxidation	Polymerization
Water Stains	X	—	—
N.G.R. Stains	X	—	—
Shading Stains	X	—	—
Fillers	X	X	X
Toners	X	X	X
Primers	X	X	X
Lacquer Sealers	X	—	—
Varnish Sealers	X	X	X
Lacquer Top Coats	X	—	—
Varnish Top Coats	X	X	X
Heat Converting Varnishes	X	—	X
Enamels (Varnish)	X	X	X
Enamels (Heat Converting)	X	—	X

Requirement of Force Drying Equipment

Because wood is hygroscopic and subject to effects of moisture change, a fourth requirement is expected of this equipment—to provide controlled humidity.

Evaporation of Solvent

By reference to Table 1 it can be seen that all of the conventional finishing materials *must lose their solvent as the first step in drying.* This is accomplished by the heat provided in the oven and by air movement. Heat provides what it takes to drive solvent from the film. Air movement carries the vapor away from the area next to the film surface, so that the evaporation process can continue at a satisfactory rate. If the vapor were not carried away some of the molecules could condense and again become entangled in the film. This would lower the net effective evaporation rate.

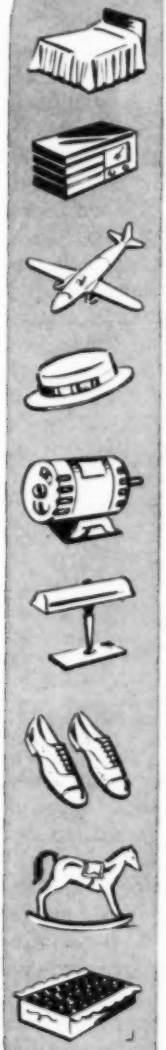
Another consideration to be made in regard to the effect of heat is that as soon as some solvent evaporation takes place a cooling effect results which tends to lower the temperature level. This means that a certain thermal input is necessary just to maintain the right balance in the system. To increase the evaporation rate, the heat must be increased too.

From a practical point of view, it would seem that the quicker the solvent can be driven off, the faster will be the total finishing schedule. This is true, but there are limiting factors introduced by performance characteristics of the material. Often, time must be sacrificed to obtain proper performance. Solvent must be lost at a rate that will reconcile these factors.

Too Rapid Evaporation of Solvent Causes Trouble

Sufficient time must be allowed, for instance, for the material to flow out properly before too much solvent is lost. If this time is not allowed the film will show "orange peel."

Too rapid initial evaporation, whether from too much heat or air



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movement, might cause excessive solvent loss from the surface of the film, resulting in "casehardening." Then, as the solvent beneath the surface tries to escape through the hardened surface, it will form small bubbles or blisters.

Also, if suitable balance is not maintained between heat input and rate of evaporation, excessive evaporation of solvent from air flow might reduce the temperature sufficiently to condense moisture on the wet finish. Water would "kick out" solids from colloidal solution causing bloom, or blushing, evidenced by areas of dullness and whitening of the film. In most cases subsequent heating is not sufficient to remove this defect.

The proper rate of evaporation is determined by the performance of the particular material being dried. This is sometimes done by providing a gradual increase of temperature or air movement in the oven. As a matter of fact, in the majority of cases, a "flash off" time at room temperature is necessary before force drying begins.

Provision of Oxygen

Oxygen is supplied by moving fresh air into and through the drying oven. If insufficient oxygen is provided, it means improper drying of the finish. In the case of fillers or wiping stains, improper drying could lead to poor wiping, open pores and filler blushing. With varnish sealers or primers, poor sanding would be encountered, and unsatisfactory adhesion could result. Improperly dried top coats would show poor print resistance, unsatisfactory water and chemical resistance, softening back during rubbing and buffing; and many and varied surface defects.

Thermal Molecular Excitation

Polymerizing reactions involved in the curing of thermal setting and drying of other types of varnishes are dependent on the increased movement of molecules. Simply by the law of probability, separate molecules will contact each other more often in a given time if the frequency of their vibration and orbit of activity are increased.

Heat is the most common method of exciting molecules. The heat-converting resinous materials are so formulated that on molecular excitation the smaller chemical units unite to form larger molecular units that make up the film-forming polymers. The only factor to be considered here is that the force-drying equipment provides the temperature and time schedule that the formulator has found are necessary for the particular coating involved.

Time and Temperature Study

The chart marked Fig. 1 shows a typical time and temperature study of a conventional thermal-setting coating. Temperature ladders are run to determine such curves at several temperature levels. The point at which the proper hardness is obtained determines the recommended temperature-time schedule. The proper hardness rating is that point at which satisfactory chemical resistance is attained, as well as the actual hardness necessary for the proper rubbing and packing. [*Continued on page 78*]

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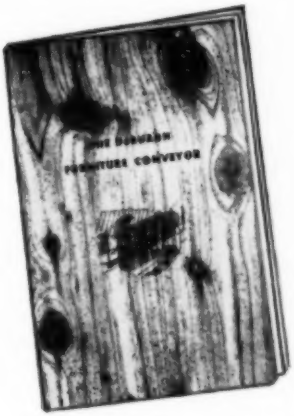

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2½ hours at 130° F.	1½ hours at 130° F.	1 hour at 130° F.
3 hours at 120° F.	2 hours at 120° F.	1½ hours at 120° F.
16 hours at 100° F.	16 hours at 100° F.	16 hours at 100° F.

Table 2—Equivalent baking schedule for conventional thermal setting varnishes.

[1]For finishes to be rubbed, buffed or packed one hour after removal from oven.

[2]For finishes to be rubbed or buffed 18 to 24 hours after removal from oven.

[3]For finishes to be packed unrubbed 18 to 24 hours after removal from oven.

Table 2 shows typical equivalent temperature-time schedule comparisons, as developed from the type of data described above.

Needless to say, insufficient heat would result in undercuring and the same general film failures that improper drying of oxidizing finishes would exhibit.

Humidity Control

It is believed that most finishers prefer to maintain wood moisture contents at 5% to 7%. Table 3 shows the relative humidity values necessary at various temperature levels to maintain a 7% moisture content. Table 4 gives data at 5%.

In general, any humidity is a deterrent to finish drying, since moisture vapor in the atmosphere retards evaporation of solvent. Excessive humidity is also a source of trouble due to its possible condensation into the film, causing poor drying, blushing, blooming, frosting or low gloss.

In the polymerization process, certain volatile vapors, not solvents, are released by the chemical reaction. High humidity retards the release of these vapors. Figures 2 and 3 show the effect of humidity on curing converting varnish.

Figure 2 shows the curve resulting from plotting hardness against

°F. Dry-bulb	°F. Wet-bulb depression	Relative Humidity Percent
100	21	39
110	22	41
120	23	42
130	24	45
140	25	47
150	25	49

Table 3—Relative humidity-temperature to maintain 7% equilibrium moisture content.

°F. Dry-bulb	°F. Wet-bulb depression	Relative Humidity Percent
100	28	24
110	29	27
120	32	28
130	34	29
140	34	32
150	36	33

Table 4—Relative humidity-temperature to maintain 5% equilibrum moisture content.

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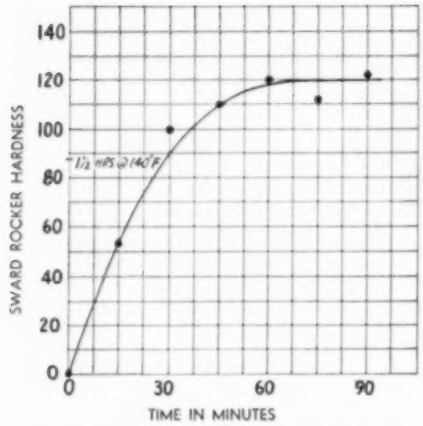

Fig. 1: Effect of time on varnish curing.

humidity at a fixed schedule of 140° F. for 1½ hours on walnut panels at 7% moisture content.

Figure 3 is the same, except that glass panels were used in order to obtain direct hardness readings free from surface variations in the substrata.

Hardness was determined by the Sward Hardness Rocker, an instrument that works on the principle that soft surfaces will provide more resistance than harder ones to swinging of the chrome-plated brass swings. The values are simply the number of swings made through an arc of 20° as measured by tube style levels.

The tables show that as humidity is increased, film hardness decreases. At about 60% the hardness drops off sharply, indicating practically no cure at higher humidity levels.

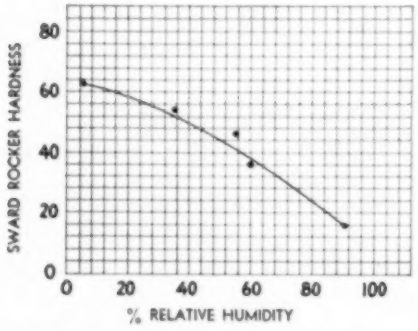

Fig. 2: Effect of humidity on varnish curing.

Desirable Equipment Design Characteristics

In view of the demands made on oven and conveyor equipment by the fundamental chemical and physical properties of finishing materials, it would be well to discuss the very basic desirable design features from the finish producers' point of view. These are discussed under the three functions of force drying equipment: 1) Temperature and time schedule, 2) Air movement and 3) Humidity control.

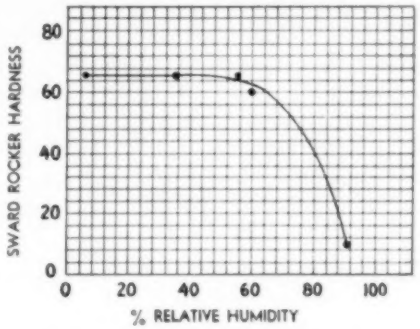

Fig. 3: Force-drying schedule study.

Temperature-Time Schedule

The major concern under this function is that the temperature cycle be satisfactory. In general the temperature should rise gradu-

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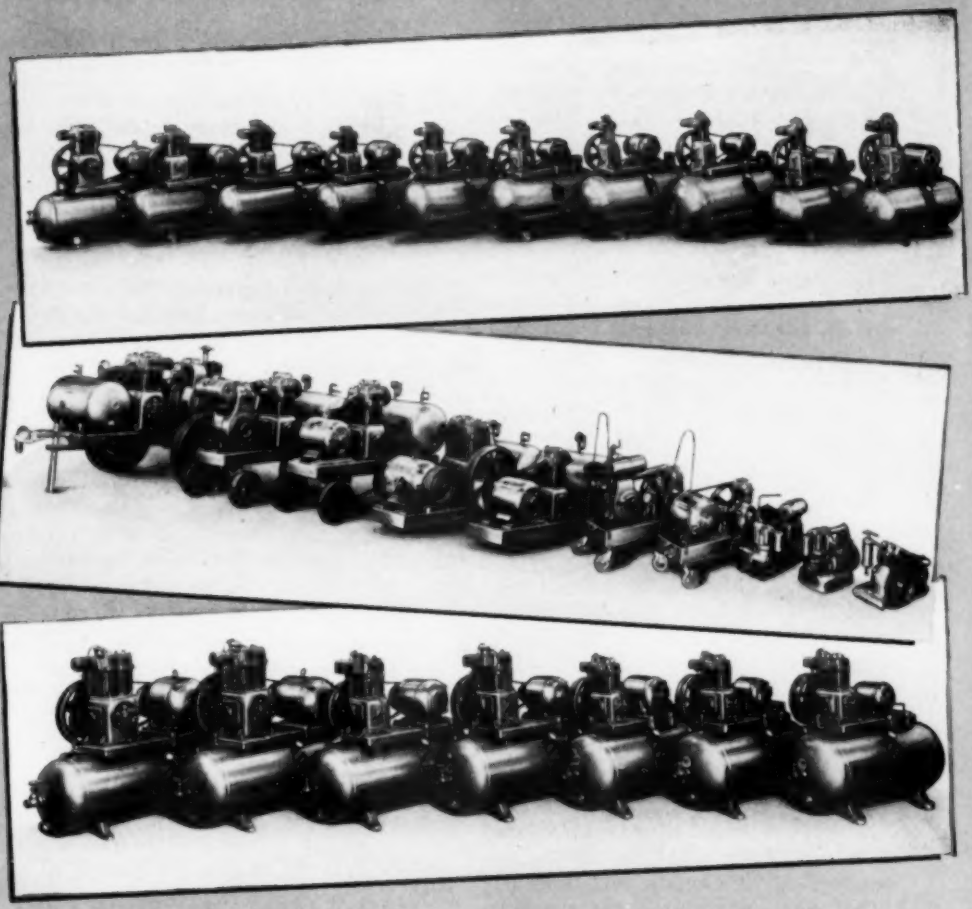

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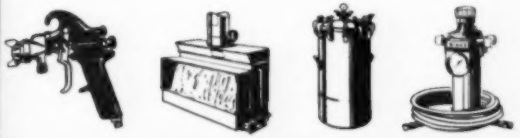

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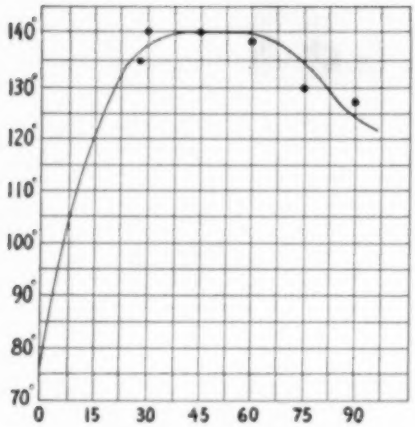


Fig. 4: Improper baking-temperature curve.

ally, reach the specified level and hold at that value for the proper time. In some cases ovens are designed on the basis of finishing material formulations, but in the majority of cases the opposite is true. Regardless of which is the case, the proper temperature cycle must be provided.

Figure 4 shows the type of temperature cycle that is often encountered. Obviously this does not give the optimum temperature throughout the entire length of the cycle. Figure 5 shows the desirable curve. The sliding temperature curve of Figure 4 is often encountered in batch-type kilns where the heat is turned on full late in the afternoon, then turned off at quitting time and allowed to drift during the night. The same type of thing is encountered in conveyor ovens, probably because of improper design or inconsistent control.

Also of importance to proper drying of the finish is the distribution of heat. There should be suitable heat in every area of the oven. Many times the bottom of the tunnel is not sufficiently heated. How the heat is introduced is a problem for the oven engineers, but in their designs they should take into consideration the type, size and shape of pieces being finished. This may make some differences in the manner in which the heat distribution is provided.

It is important that the kiln and conveyor designers recognize the type of coating materials to be used, and that they are familiar with their properties. Complete knowledge of these facts will aid greatly in providing the correct flash-off time, upheat rates, and temperature and conveyor speeds.

In conveyor systems the time factor is controlled by the speed of movement through the oven. Conveyor engineers are therefore to be consulted as an integral part of the team that must cooperate in this endeavor. [*Continued on page 86*]

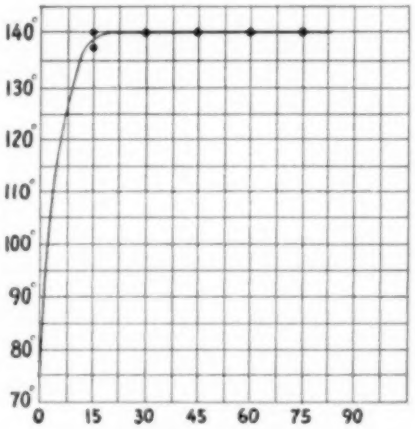
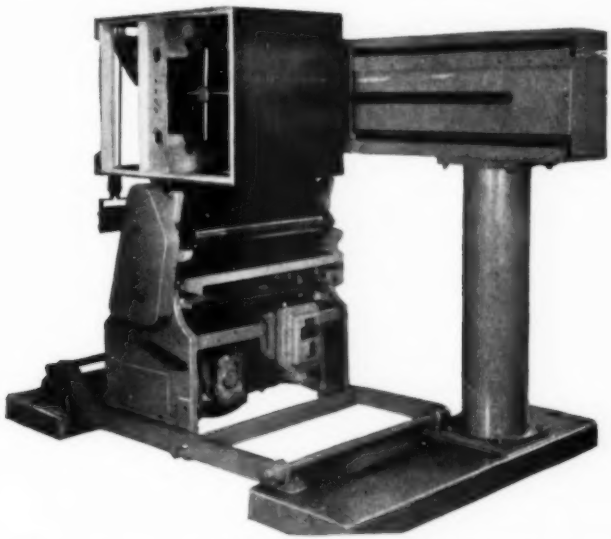


Fig. 5: Ideal baking-temperature curve.



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The flow of air through a conveyorized oven or tunnel-type kiln should preferably be counter to the direction of movement of the finished pieces. In this way air, relatively free from vapor, sweeps across the dried film first and carries vapor it picks up in its travel through the oven toward the front end where vapor concentration is necessarily high.

If the air movement is in the direction of flow of pieces, it would carry vapor-laden air over the dried film, thus tending to reduce maximum drying efficiency, and in extreme cases, it would resoften the finish.

Distribution of Air: Movement of air is not the only consideration to be made. As pointed out previously, the heat should be evenly distributed, so the air movement will be such that there is hot air moving throughout the entire cross section of the oven.

Amount of Air Flow: The amount of air introduced into the oven is limited on the maximum side by economy and on minimum by the lower explosive limit. The National Board of Fire Underwriters requires not less than 10,000-cu.ft. of fresh air per gallon of solvent to be evaporated.

Ratio of Fresh Air: Another consideration of the air flow problem is the ratio of recirculated air to fresh air. A generally accepted ratio is three parts of recirculated air to one of fresh air. No formula exists to logically determine this ratio. Consultation with the finish supplier, finisher and equipment manufacturer would be in order.

The main things to keep in mind in regard to humidity are: 1) That proper engineering has been applied to provide suitable moisture content, and a method to accurately control that content, and 2) That good maintenance is provided to insure consistent humidity control.

A factor of equal importance to that of engineering to obtain satisfactory levels and distribution of heat, air and humidity is the provision of high-quality instrumentation. Recording thermometers, manometers and hygrometers properly placed are highly desirable. The cost of installation and maintenance of such equipment will surely pay for itself in reduced finishing troubles. The assurance of properly operating equipment adds to the efficiency of plant operation and finishing quality control.

There is need for serious study on certain phases of the general problem of drying finishes on wood products. Someone, for example, should develop a physical law to explain the phenomena involved in the retarded evaporation of solvents by high humidities.

All of the factors should be considered to arrive at some kind of rule regarding the length of flash-off time necessary for particular finishes.

A formula should be developed to determine the amount of fresh air necessary to dry a finish and its correct ratio to recirculated air.

---

*From a paper presented at the eighth Annual National Meeting of the Forest Products Research Soc. in Grand Rapids, Michigan, May 5, 6 and 7, 1954.

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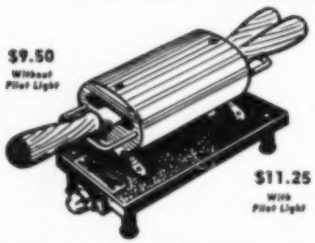

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Random Comment on the Industrial Scene

(Continued from page 8)

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Cordless Lamps. Electric bulbs that produce light without electric cords are now in the process of development. This may eventually make drastic changes in the design of some portable lamps.

The principle involved is that a transmitter installed in the building sends out electric waves which are picked up by an antenna on the lamp. The antenna is connected to the bulb which receives "broadcast" electric current.

* * *

Portable Platform Lift is available for elevated mainetnance jobs such as replacing lamps bulbs, lubricating and repairing equipment, etc. The motor driven platform will rise as high as 20-ft. at the rate of about a foot a second. At elevated heights the platform can be extended as much as 16-ft. beyond the truck wheels.

D. E. Murphy, Sales Mgr., West Coast Div'n. of..Rinshed-Mason

D. E. Murphy has been appointed General Sales Manager, West Coast Division of the Rinshed-Mason Co., Anaheim, Calif., manufacturer of automotive and industrial paints, enamels and lacquers. Murphy attended the University of Detroit and graduated from Detroit Institute of Technology.

GREAT NEW SELLING FEATURES FOR YOUR PRODUCT

When You Use

COPON

—the revolutionary protective coating that resists acids, alkalis, abrasions, rust and corrosion

Because COPON is a coating with so many remarkable features, it gives products important selling advantages. Perhaps COPON is just what you need to give your product new, dynamic sales appeal. Write us about your coating problems.

CHECK THESE COPON FEATURES

- Acid and alkali resisting
- Abrasion resisting
- Rust and corrosion resisting
- Greater flexibility and adhesion to withstand severe bends and stresses
- Available in baking, amine-cured and air-dry coatings
- Available in all colors

CPL

COAST Paint & Lacquer Co. Inc.

P. O. BOX 1113, HOUSTON 1, TEXAS

Dick Larrabee Joins Andrew Brown Co. and Goes East

The Andrew Brown Co., Los Anegeles, manufacturer of Brolite Finishes, has appointed Richard M. Larrabee as field representative for its Maryland factory, with headquarters in New York City.

Last minute chat before Dick Larrabee left for the East. Left to right: Jack Lockwood who pilots Z-Spar sales in the West; Dick Larrabee; and Andrew Brown, President of Andrew Brown Company.

For three years prior to joining the Andrew Brown Co., Dick was West Coast manager for another finish manufacturer. Most of his work, however, has been in the East, and he looks forward to renewing many associations there.

The Andrew Brown Co. manufactures Brolite Aviation Finishes, Brolite Industrial Finishes, Brolite Automotive Finishes, and Brolite Z-Spar Marine Finishes. Its factories are located in Los Angeles, Calif.; Laurel, Md. and Irving, Texas.

Hi-Sol Hot Lacquers Announced

The Eli-Bee Chemical Co. of Hanover, N. J., has announced a full line of clear hot lacquers called "Hi-Sol". They are formulated for use on metal and wood. They are available in any sheen from high gloss to dead flat, with 40% solids content.

The manufacturer also states these clear hot lacquers spray and flow well; they produce a film of finish that is durable, flexible and resistant to cold-checking; and it can be rubbed.

Hanna Completes Move Into Million Dollar Plant

Headquarters of the Hanna Paint Mfg. Co. has been moved to a million dollar factory at 1313 Windsor Ave., Columbus, Ohio.

The plant is equipped with the latest facilities and equipment for paint manufacturing. It consists of six buildings. The main building comprises offices, laboratory, three-floor manufacturing area, warehouse, shipping and receiving departments. Other buildings house equipment for making varnish, lacquers and other industrial finishes.

Other Hanna plants are located at Pittsburgh, Birmingham and Dallas.

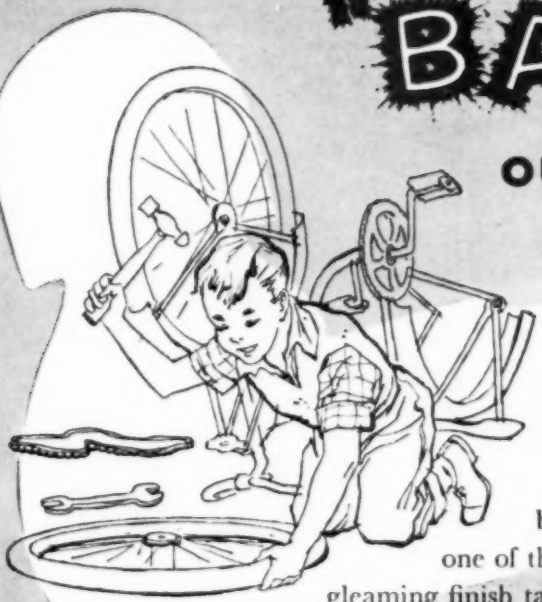
New million dollar plant and main offices of the Hanna Paint Mfg. Co., Columbus, Ohio.

It happens every day...

BIKES GET A BIG

"BANG"

OUT OF KIDS



One of Junior's biggest thrills comes during a bicycle overhaul job . . . one of the many occasions when the gleaming finish takes a beating.

In designing the Silver King, Monark engineers built in as many "boy-proof" features as possible. They turned to the Arco Research Laboratory for a finish to resist the inevitable scratches and abrasions imposed by normal, eager, energetic kids.

Why not take *your* finishing problems to ARCO where experienced formulators tailor quality paints to exacting specifications—and *pre-prove* performance by Arco Cycle Testing, a system which evaluates finishes to a degree unequalled in the industry.
Write for full details.

ARCO PAINTS
Quality... SINCE 1881

TESTED FIRST TO *LAST!*

THE ARCO COMPANY • CLEVELAND 27, OHIO • LOS ANGELES 1, CAL.
A SUBSIDIARY OF AMERICAN-MARIETTA COMPANY

THERE'S NO SUBSTITUTE FOR
DETROIT "TAC" RAGS
IN YOUR FINISHING DEPARTMENT

DETROIT "TAC" RAGS are an absolute necessity for cleaning any metal, wood or plastic surface before painting. Removes all dust, lint and sanding particles.
Order today through your supplier.
STANDARD OF THE FINISHING INDUSTRY SINCE 1934
DETRO MFG. & SALES CO., INC., CULVER CITY, CALIFORNIA

Airless Spray Painting Clinic Held in Charlotte, N. C.

Two hundred industrial paint users and suppliers attended a 3-day demonstration clinic on hot spray and airless spray painting in Charlotte, N. C., May 6, 7, 8.

At the clinic all phases of paint application problems were covered for large and small users—hot spray as well as airless spray painting. One session was devoted to the airless process for maintenance painting; another to paint formulations for hot spray and airless spraying.

The clinic and demonstration produced great interest in the two processes among painting contractors and furniture manufacturers.

The event was sponsored by the Marietta Paint & Color Co., 2100 N. Church St., Charlotte 1, N. C., distributor for Bede Products, Inc., of Cleveland, Ohio.

J. Holland & Sons Moves to Larger Quarters

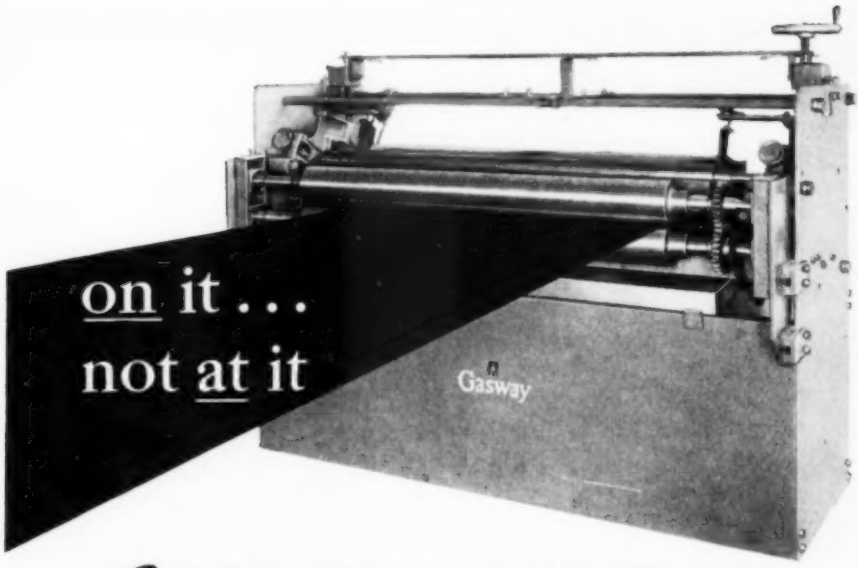
J. Holland & Sons, Inc., manufacturer and distributor of metal finishing equipment, has moved into its new home at 475 Keap St., Brooklyn, N. Y.

The new 110,000-sq.ft. manufacturing plant is located in the heart of industrial Brooklyn, a short distance from the former Holland building.

J. Holland & Sons new quarters.

According to Charles Holland, president, the new building will house one of the largest stocks in the industry, enabling the firm to offer quick delivery of practically any metal finishing need.

James A. Bede demonstrates the heavy build-up possible with airless spray painting.



GASWAY ROLLACOATING puts the finish on the work . . . not in the air

Finishing flat sheets and panels by Gasway ROLLACOATING puts the paint right where it belongs—on the work. No overspray, no overflow. You breathe easy while ROLLACOATING does the finishing.

Gasway ROLLACOATING precisely meters the amount of finish laid down. And *all* this finish goes where you want it. Film thickness is held constant within a tenth of a mil. Every piece is finished perfectly—just like the one before. Baking is always uniform. ROLLACOATING cuts paint costs one-third or more, because you use all the finish you pay for.

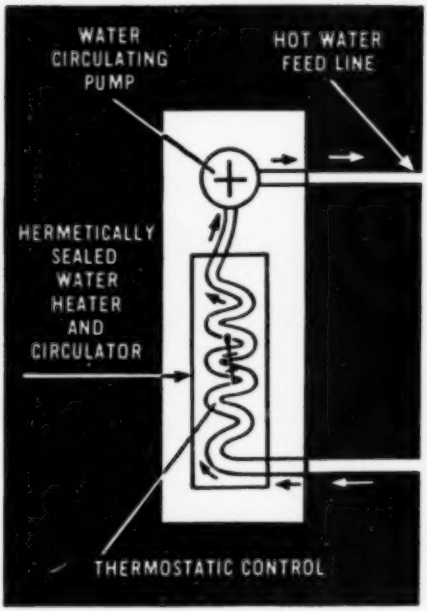
Compare other finishing methods with the speed, quality, and economy of easy Gasway ROLLACOATING. Write for all the facts.

Gasway makes a complete line of machines for roll-finishing flat sheets and panels up to 72" wide, and the only completely integrated continuous cleaning-treating-finishing-baking lines for flat strip and webs.

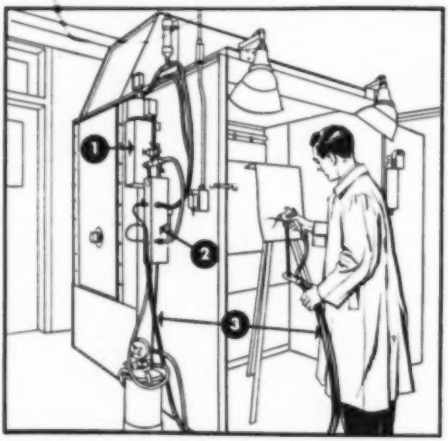
Gasway CORPORATION

6463 NORTH RAVENSWOOD AVENUE, CHICAGO 26, ILLINOIS

New DeVilbiss Paint Heater offers you these advantages: no clogging, no overheating, no churning of paint, no variable fluid pressures. Adapts easily to multiple colors and spray stations. Safe and easy to clean. Low in price.



New DeVilbiss Paint Heater has three



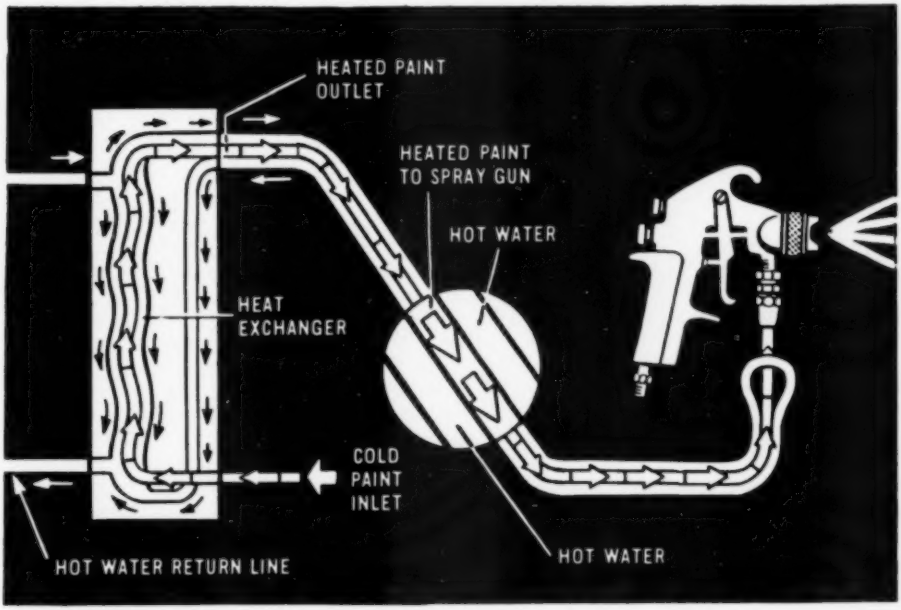
1. Water is heated and circulated by Master Heater. 2. Hot water heats paint in Heat Exchanger. 3. Paint is kept hot right up to the spray gun. Hot water circulates through supply-and-return passages in unique heat jacket surrounding hose.

From DEVILBISS

Now! DeVilbiss' new paint heater gives you precision temperature and viscosity control . . . lets you take full advantage of the hot-spray method without paint overheating and constant maintenance.

Paint is heated to exact temperatures, almost instantly, in a revolutionary Heat Exchanger. Kept hot, too – right up to the gun – with an exclusive heat jacketed hose assembly . . . even

BRANCH OFFICES AND DISTRIBUTORS



components: 1. Master Heater, 2. Heat Exchanger, 3. Heat Jacketed Hose Assembly.

. . . a fast, foolproof paint heater!

with extended hose lengths. There's no heater paint pump to wear out!

If you'd like to enjoy the big benefits of hot spraying – better finishes with fewer coats, less paint loss from overspray, no worries about variable room and paint temperatures which affect material viscosity – get complete details about the new DeVilbiss Paint Heater.

Call the nearest DeVilbiss branch office for full details or write us direct. Do it today!

THE DEVILBISS COMPANY
Toledo, Ohio

Santa Clara, Calif. • Barrie, Ontario
London, England

FOR BETTER SERVICE, BUY
DEVILBISS

IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES, CANADA AND THE WORLD

Catalyst Spraying

From June 1953 issue of *Industrial Finishing* we have learned that you are in possession of reprints of the article treating the subject, "Catalyst Spraying." We would be much obliged if you would forward a copy to us.—*Institute of Technology . . . Copenhagen, Denmark.*

No reprints, but we are sending you a set of tear sheets.—*Editor.*

Stirring and Pumping Direct from Drum

We believe that certain industrial lacquer users in your country use a 50-gallon barrel fitted with stirring gear operated by compressed air. The center shaft, which is hollow, is also adapted to draw off the mixed material. We would be obliged if you could put us in touch with any makers of such apparatus in the U.S.A.—*J. & N., Ltd., London, England.*

Yes, there are two of them—The Gray Co. (Paintmaster) and Stewart-Warner (Versatal). In a letter we are giving you the complete addresses of both companies.—*Editor.*

Hot Stamping Process

I am a little behind in my reading, but last night I caught up on Industrial Finishing (which is high on my required list).

We will appreciate learning the name and address of the "K. Inc." company whose question about "Painting Raised Letters" on molded plastic signs appeared in April 1954 issue, page 82. We believe they should be using the Peerless Hot Stamping Process for Decorating their signs and other plastic parts. This is an inexpensive method, and is particularly adapted for the use described by "K. Inc.".—*Peter & Co.*

In a letter we are giving you the name and address of "K. Inc."—*Ed.*

Numbering Terminals

In reference to a requirement for numbering terminals in diagrams, we note an article in the January 1954 issue, on page 122, of a metal foil nameplate that is titled, "Speedy Cals." We will appreciate it if you will forward us the name of the concern manufacturing these items.—*C.S.G.*

It's North Shore Nameplate Co., Bank of Manhattan Bldg., Bayside, L. I., New York.—*Editor.*

Graining on Hardboard

We are interested in applying a wood grain design to hardboard. Please tell us the names of some manufacturers who furnish the equipment to do this work. We are also interested in the names of suppliers selling hand roller graining tools.

Your February issue had a picture of graining applied to the plain

Mac's

FASHION CRISTALITE *LACQUERS and SEALERS*

Are especially formulated for the light blonde or bleached finishes. They are "water white" and do not impart any color to the surface.

They have high solids content and produce excellent body. They will not mar or scratch readily and can be sanded in one hour.

Mac's Cristalite Lacquers are available in various sheens.

Write for samples and descriptive folder.

The Lawrence-McFadden Co.

Headquarters for Fine Finishes Since 1875

7430 STATE ROAD *"Our 78th Year"* **PHILADELPHIA 36, PA.**

CHANGE DRUM TUMBLER

A portable inclined ramp slips loaded drum into yoke with little effort.

The illustration shows a machine designed to make a churn out of any drum, barrel or small tank for mixing, agitating or blending contents. The change drum feature avoids cleaning delays inherent in the old type barrel tumbler as well as eliminating any possibility of contaminating different products.

Well braced end supports of heavy boiler plate are properly spaced with angle iron, the complete assembly being welded throughout to form a rigid unit sufficiently heavy to absorb the shock of large reciprocating loads.

A detachable crank on end of motor shaft makes it possible to turn yoke to proper angle for drum transfer. During processing of material power can be cut off and drum turned to horizontal position for sampling contents, adding additional material, or for draining.

Further details and prices on request.

THE VOL-U-METER CO., P. O. Box 54, Buffalo 16, N. Y.

corners of cabinets (page 40). Please advise who makes this type of equipment.—*C.F.*

In a letter we are naming five suppliers of production graining equipment—some of them advertisers in this magazine—and one supplier of hand graining rollers.—*Editor.*

"You have a nerve trying to impress me by spraying flock on your chest."

Pearl Finished Lure

We have a wobbling spoon, solid brass fishing lure that we wish to get a good pearl finish on. Can you quote us on either the material and we do the work, and/or you do the job yourself? We want a real finish, or will not be able to handle it.—*D.D. Shop.*

We are not custom finishers or suppliers of materials, but in this issue of *Industrial Finishing* you will find advertisements of pearl essence finishes. In a letter we are giving you further information.—*Editor.*

Storage Racks for Drums

Will you furnish us the names of any companies who manufacture racks for storing paint and oil drums? —*M.H., Inc.*

There are several. You might try the one whose painting setup was described and illustrated in April 1954 issue of this magazine, pages 28-38. It is the Mult-A-Frame Division of Ainsworth Mfg. Co., 1477 E. Atwater St., Detroit 7, Michigan.—*Editor.*

Who Makes Incinerator?

On page 4 of May issue you have a "Random Comment" paragraph entitled, "Burns Refuse Safely." Will you please advise us who manufactures this type of "down draft incinerators"?

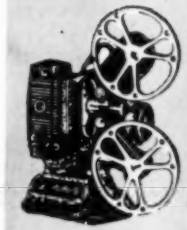
It's Winnen Incinerator Co., 932 Broadway, Bedford, Ohio.—*Editor.*

Empty Lacquer Drums

We have been advised that in February issue, S. Cabinet Works was inquiring about empty lacquer drums. We accumulate from 15 to 20 of these drums per week, and are interested in hearing from these people with their offer. Since we do not know of them or their location, would you contact them for us?—*P.C. Co.*

In the published inquiry which appeared in February 1954 issue, in "Letters from Readers," on page 80—the one entitled, "Buy Empty Finish Drums?"—the S. Cabinet Works is asking *where they can sell or get rid of empty lacquer drums;* they are not buying them.

As a result of our publishing the above inquiry, we received a letter



INSTRUMENT BLACK

UNI-VERSAL PRIMER OR TOP COAT

PERFECT FOR ANY PRODUCT WHERE A NON-REFLECTING COATING IS NEEDED

Cameras, tripods, instruments of all kinds can benefit from the rich, dull black of Uni-Versal primer. It has found endless applications both as a primer and as a top coat in finishing wrought iron furniture, lamps, tools and many other products made of ferrous and non-ferrous metals. Most colors, in addition to Instrument Black, are available for prompt shipment from stock. Also available in semi-gloss.

Uni-Versal Primer has gained such widespread recognition because it anchors itself with such firmness to the metal surface that all normal drawing, blanking or extruding operations can be performed after coating, without disturbing the finish. It provides unusual resistance to salt spray, humidity, abrasion, as well.

Uni-Versal Primer air dries in 15 minutes and is ready to handle in 30 minutes. It can also be force dried, or baked before or after applying a top coat.

Write today for a free working sample of Uni-Versal Primer for tests on your own products.

PAINTS · SYNTHETICS
UNITED
LACQUERS · ENAMELS

United LACQUER MFG. CORP.

LINDEN, N. J.

from Acme Service & Container Co., 12800 Eaton Ave., Detroit 27, Mich., advising that they would be interested in purchasing used steel drums; they recondition them for resale.

There are a number of these concerns that do reconditioning of steel drums. Two other concerns in this business in Detroit, Mich., are Rubin Barrel & Drum, 14367 Ilene, and American Barrel, 14115 Prairie.—*Ed.*

"I'm spraying butter! What's the use of working in a spray paint shop if you don't take advantage of it?"

They Like I. F. Cartoons

I wish to congratulate you on the selection of cartoons appearing in your magazine. They show excellent taste; they are to the point; and they are always well received by the employes of our finishing department. As a matter of fact, since there is not enough time to have them read the magazine individually, we select articles which we think might interest the employes and we post them on the bulletin board together with the cartoons that we cut out for that purpose. The latter always produces healthy chuckles and teaches the employes to laugh at themselves. Some subtle hints even have had corrective effects on their general attitude toward their jobs and on housekeeping.

In connection with the cartoons, I would like to offer a suggestion. Inasmuch as they cannot be cut out of the magazine without destroying the page itself, could you devise some means by which the cartoons would be duplicated on an insert page? In this way, the recipients of your magagine would be able to keep it intact for ready reference, and at the same time, post the cartoons if they choose to do so.—*J. J. Pardes, American Optical Company.*

Spray Gun Efficiency; Orange Peel

Would you please send us a copy of your October article entitled "Spray Gun Efficiency"? Also permission to reprint? Approximately four years ago you had an article on "Orange Peel." Would it be possible to secure a copy of this?—*B.C.Co.*

In complaince with your request, we are sending you tear sheets of the two articles. You may reprint one or both provided you include a credit line to the effect that it is reprinted from Industrial Finishing Magazine, Indianapolis, Indiana.—*Editor.*

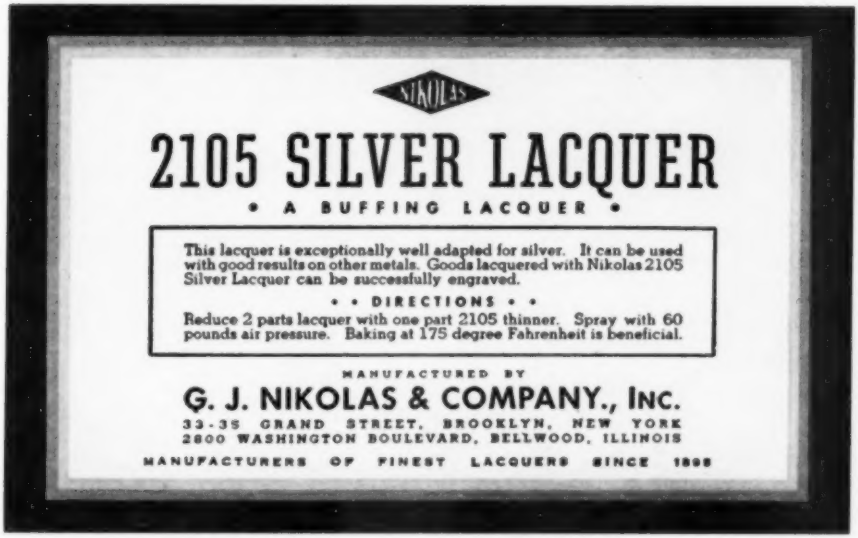
Luminous Paints

Can you refer us to a maker of a paint, a pigment or a coated tape which has the property of absorbing light during the day or during illuminated hours and which then gives off a glow for a short time after the lights are turned off?

I believe this is a product that was used to mark direction to air raid

QUALITY THAT SPEAKS FOR ITSELF

This Label is used for the finest clear lacquer yet produced for — Plated Goods — Silver Nitrate Films — Holloware — Cellulose Acetate Butyrate Plastic — Vaporized Metal Coatings — and many others.


NIKOLAS
2105 SILVER LACQUER
• A BUFFING LACQUER •
This lacquer is exceptionally well adapted for silver. It can be used with good results on other metals. Goods lacquered with Nikolas 2105 Silver Lacquer can be successfully engraved.
• • DIRECTIONS • •
Reduce 2 parts lacquer with one part 2105 thinner. Spray with 60 pounds air pressure. Baking at 175 degree Fahrenheit is beneficial.
MANUFACTURED BY
G. J. NIKOLAS & COMPANY., INC.
33-35 GRAND STREET, BROOKLYN, NEW YORK
2800 WASHINGTON BOULEVARD, BELLWOOD, ILLINOIS
MANUFACTURERS OF FINEST LACQUERS SINCE 1895

- **Fast Drying**
- **Water White**
- **Crystal Clear**
- **Non-Discoloring**
- **Excellent Adhesion**
- **Mar-Resistant Hardness**

For Full Information Write—

G. J. NIKOLAS & CO., Inc.

Manufacturers of Finest Lacquers Since 1895

2850 WASHINGTON BLVD.
BELLWOOD, ILLINOIS

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BROOKLYN, N. Y.

COMPLET

. . . the **EXPERIENCE** that goes into the **PLANNING** and **ENGINEERING** of **MAHON EQUIPMENT** is the item of **GREATEST VALUE to YOU!**

Mahon four conveyor type Paint Baking Oven in the foreground and rapid line—part of this same Complete Automobile Body Finishing System.

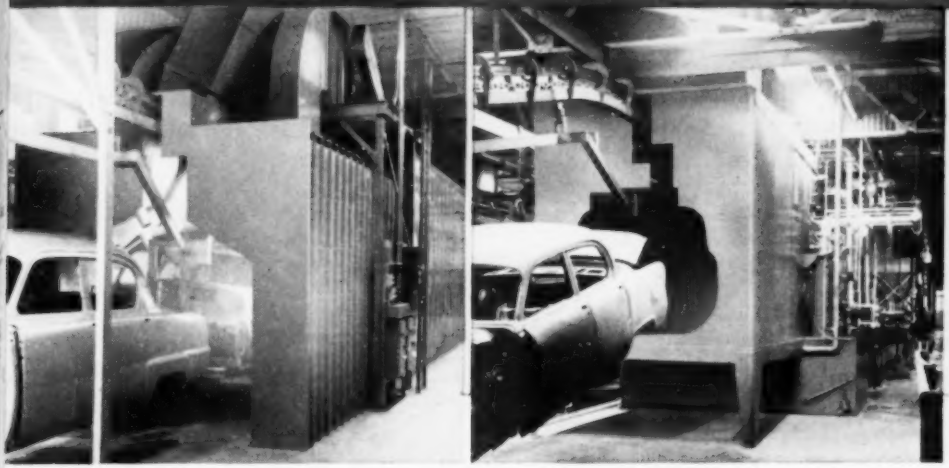
At extreme right is Mahon Six-Stage Metal Cleaning and Rust Proofing Machine with modern Fire-Jet Heating Units on Processing solution tanks. At right above: One of three Mahon Dry-Off Ovens and one of five Mahon Cooling Tunnels in this Complete Mahon Automobile Body Finishing System. Above: Interior of one of four Mahon Down-Draft Hydro-Filter Spray Booths included in this system. Note adjustable diffusers in ceiling for better air circulation control within the booth.

M

E

Finishing SYSTEMS

. . . *for* ENAMELS • LACQUER • PAINT • VARNISH



MORE AUTOMOBILES are FINISHED in COMPLETE MAHON FINISHING SYSTEMS than ALL OTHERS COMBINED!

Illustrated here is another Complete Mahon Finishing System installed for one of the world's largest producers of fine automobiles. Embodied in this system are all the latest developments in equipment of this type . . . it combines all the major units of equipment and other essential facilities into an efficient, smooth running production processing system which turns out the ultimate in fine finish. If you have a finishing problem, or are contemplating new finishing equipment, you, like thousands of other alert manufacturers, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning, coordinating and engineering of equipment—which is the key to fine finishes at minimum cost. You will find also, that Mahon equipment is built better for more economical operation over a longer period of time—a factor which should be carefully considered when comparing initial cost figures. Mahon will do the complete job on one contract . . . undivided responsibility for the entire system safeguards you against complications which may upset your production plans and subsequent schedules. Mahon's thirty-two years of background history in this highly specialized field covers thousands of finishing systems including dip, flow coating, and spray equipment for every conceivable product painted on a production basis. See Sweet's Plant Engineering File for information, or write for Catalog A-654.

THE R. C. MAHON COMPANY • Detroit 34, Michigan • Chicago 4, Illinois

Engineers and Manufacturers of Metal Cleaning and Pickling Equipment, Metal Cleaning and Rust Proofing Equipment, Spray Booths, Flow and Dip Coaters, Drying and Baking Ovens, and Complete Conveyorized Finishing Systems.

AHON

shelters during the last war. It retained its glow long enough to direct people to their destination after a black out was declared.—*P.D. Co.*

Two manufacturers or suppliers of luminous paints are located in your city (Cleveland, Ohio). In a letter we are giving you their names and addresses; also some in other cities.

A luminous or reflecting surface tape is put out by Minnesota Mining & Mfg. Co.—*Editor.*

"Jorguson!"

Multi-Color Paint

We are interested in a finishing paint for metals, how applied, etc. We obtained some Multi-Color paint from the Pennsylvania Lacquer Center, but as to its usage they were not certain. They gave us your name and address. Some call it Prestone Paint. Maybe you can help us.

Our interest is in making juvenile toys and furniture, with the use of metal and metal parts. Our problem is a suitable paint, and how to apply it. Anything you can do for us will be appreciated.—*C.M.*

Perhaps the material you have is "Plextone," which is manufactured and sold by Maas & Waldstein Co., Plextone Div'n., 2110 McCarter Highway, Newark 4, N. J.

Another material is called "Multakolor," manufactured and sold by United Lacquer Mfg. Corp., Linden, New Jersey.

Still another is "Speck-L-Tone," manufactured and sold by Reliance Varnish Co., 4730 Crittenden Drive, Louisville 9, Kentucky.

These materials will have to be applied by spraying. You can obtain spray equipment from advertisers in this magazine.—*Editor.*

Airless Hot Spray

We have read the paragraph in the "Letters from Readers" of April 1954 issue, on page 78, regarding "Hydro-Thermic Paint Spraying" and are interested in this type of air-less spray method. We have been experimenting with one make of airless spray and would like to find another equipment manufacturer of the same.

We would appreciate your forwarding our name to them or, if this is not possible, would you be so kind as to send us all the necessary information, and we will then contact them ourselves—*M. Drum & Barrel Co.*

We are interested too.—*O.S.Co.*

. . . We are especially interested. *Allis-Chalmers Mfg. Co.*

The company you ask about, "X. Y.Z.," is identified in May 1954 issue, page 88. Another one has an advertisement in this (June) issue.—*Ed.*

PARTIAL VIEW OF THE HOME OF

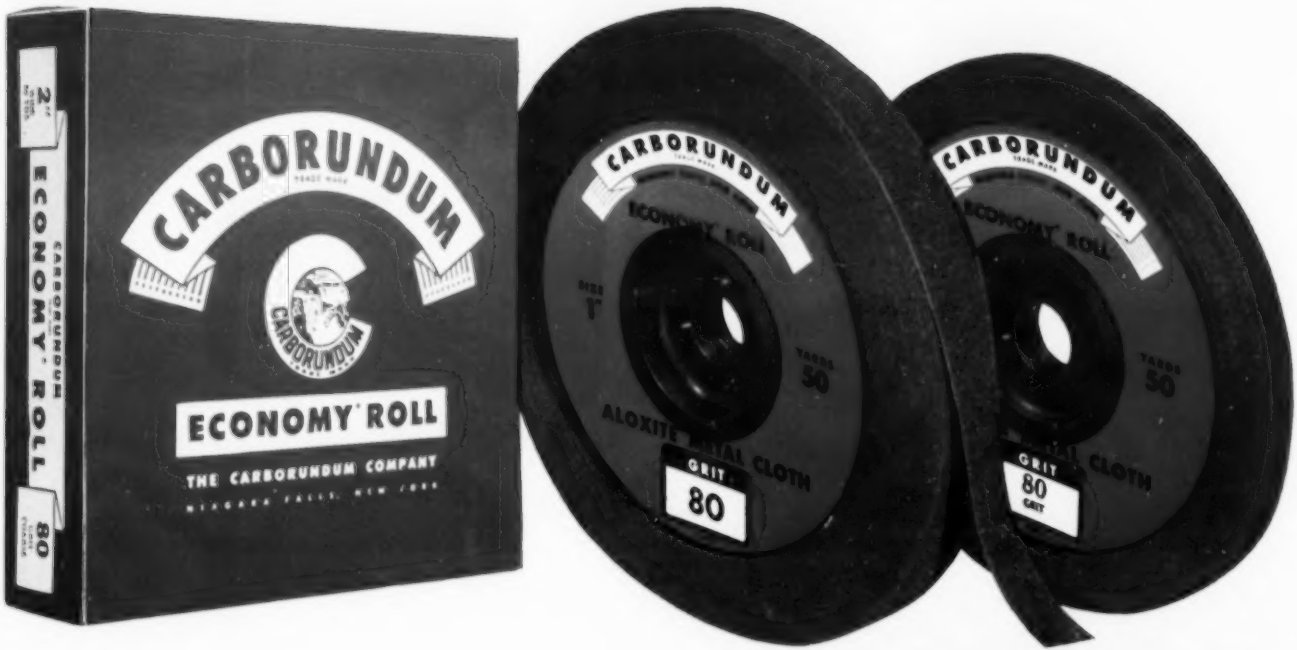
BARKER LACQUER THINNERS

Unexcelled for their high quality, uniformity and low cost

BARKER CHEMICAL COMPANY

One of America's Largest Manufacturers of Lacquer Thinners

700 EAST 138TH STREET • CHICAGO 27, ILLINOIS



Best you can buy...

ALOXITE® METAL CLOTH

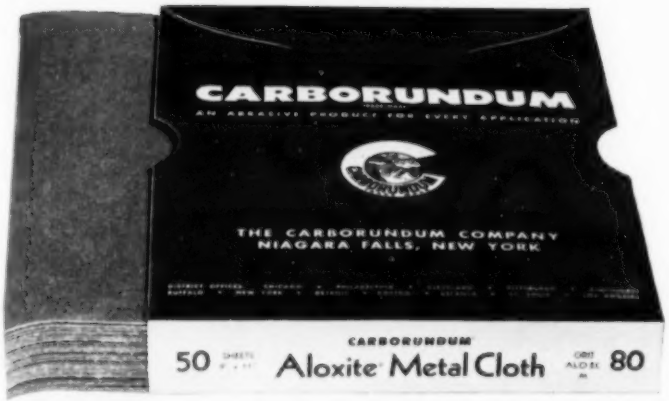
ECONOMY® ROLLS

Handy 50-yard rolls in widths from ½" to 2"—in grit sizes from 24 to 500. Rolls are mounted on plastic centers...just hang them on a nail or dowel...tear off strips as you need them.

...the tough, flexible, general purpose abrasive

9 x 11" SHEETS

ALOXITE® Metal Cloth sheets are remarkably flexible, easy to work with...even on contours and sharp corners. Packed in handy sleeves. Available in all grit sizes from 24 through 500.



YOU CAN REALLY SAVE MONEY on light maintenance and touch-up work...and on many production jobs involving roughing, blending, finishing or polishing...with ALOXITE® Metal Cloth Sheets and ECONOMY® Rolls by CARBORUNDUM. They cost so little—do so much! Order an assortment of grit sizes in both the rolls and sheets. Keep a supply at every workbench and near every metal-working machine. Your operators will find dozens of uses for them—and each use will save production time—and money. STOCK UP TODAY!

YOUR CARBORUNDUM DISTRIBUTOR or Salesman will fill your order promptly. He's listed in the yellow pages under "Abrasives" or "Grinding Wheels"...and offers expert counsel on any grinding or finishing problem, plus fast delivery of every type of abrasive product.

CARBORUNDUM

REGISTERED TRADE MARK

...continually putting more SENSE in your abrasive DOLLAR

82-415

H. E. Post to Head Pittsburgh's Pacific Coast Division

Herschel E. Post has been appointed general manager of the Pacific Coast Paint Division of the Pittsburgh Plate Glass Co. Mr. Post joined Pittsburgh in 1930 as manager of the Sacramento, California store. Later he served in various executive capacities with the company in Oakland, Calif., and Houston, Tex.

Since 1942 he has been general sales manager, industrial finishes, at the company's general offices in Pittsburgh, Penna.

Mr. Post will make his headquarters at Torrence, Calif.

Growth in Can Coatings Cited by Finish Manufacturer

The phenomenal growth of the canning industries is only part of the reason for recent volume increases in can coatings, according to W. E. Moore, chief chemist for the Andrew Brown Co. This company's Los Angeles factory (5431 S. District Blvd.) has been making around 35,000 gallons of can coatings a month, and the company has yet to announce the current volume for its Texas and Maryland factories.

Mr. Moore described three reasons for the increased use of can coatings:

1) Thinner tin coatings make additional protection more necessary than formerly.

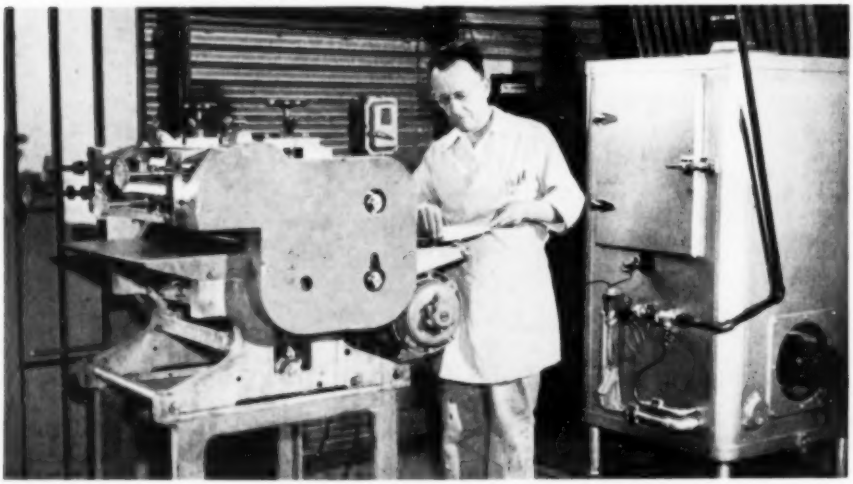
2) Many types of canned foods (such as corn) or beverages (beer) require a coating to prevent a "metallic" change in the flavor.

3) The new practice of bottling soft drinks in cans is increasing the volume of can coatings daily.

Mr. Moore describes the production of can coatings as technically very exacting. In addition to the actual mechanical coating requirements, almost every type of food or beverage requires another type of can coating. To mention just a few, Moore named beer, corn, soda pop, spinach and peaches as requiring special coatings to preserve their respective flavors intact.

The Andrew Brown Co. now formulates over 50 different types of can coatings and expects the number to increase in the future, as new products are canned and new techniques are employed by the canner.

Can manufacturers who are experiencing difficulties in their coating techniques are invited to write, phone or wire Mr. Moore, c/o Andrew Brown Company, 5431 S. District Blvd., Los Angeles 22, Calif.



John Willis, Andrew Brown Co. chemist, uses a complete roller coat and baking system to check new can coating formulas. Addition of this equipment to the company's laboratory testing department resulted from orders for an increased volume of can coating materials.

IT'S LABOR SAVING

★
★
★

USE

SPEED-CUT

the different RUBBING LUBRICANT

DEVELOPMENT AND HISTORICAL BACKGROUND

Credit for the present day "Speed-Cut" rubbing lubricant and its widespread use among the Southern furniture manufacturers is due to a great degree, to the "inquiring mind" of Mr. Jess Mitchell, production foreman for Broyhill Furniture Factories and their Harper plant rubbing department. It was Mr. Mitchell's idea that with the right combination and use of wet or dry sandpaper and a special lubricant, he could produce the desired sheen on furniture finishes without resorting to the heretofore laborious and slow "felt and pumice" operation. To succeed at this would mean increased production with less operations, at decreased labor costs.

Working closely with Mr. Mitchell and his men for several months we eventually found the right combination and use of sandpaper and lubricant. One complemented the other as only together would the system work. This was the birth of the "Speed-Cut" lubricant and was later to be called the "Speed-Cut System" for rubbing and polishing fine furniture. A simple and low cost rubbing lubricant has revolutionized the industry.

Samples and full details available on letterhead request.

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Resinous Wax Division

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*Facts from
Egyptian New Product
Field Report

EGYPTIAN Industrial Finishes

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GREATER IMPACT RESISTANCE* New Egyptian 700 Glaze showed greater resistance to impact and mechanical abuse than any comparable system tried.

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EVEN FREER SANDING* New Egyptian 700 Glaze proved to be even freer sanding than comparable systems. Need for coarse sanding eliminated. Sanding is done with #100 and #150 paper. Most small castings require no sanding.

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Your Egyptian Industrial Finishes Specialist is anxious to show you how the NEW EGYPTIAN 700 SYSTEM can cut your costs of finishing Castings, Machine Tools and Fabricated Metals without cutting quality. No obligation of course.

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Show me how NEW EGYPTIAN 700 GLAZE can cut my Finishing Costs and still retain the Qualities of Slower Drying Finishes.

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Company .....

Street .....

City ..... State .....

Is Glue Sizing OK?

Some time ago I read an article in this magazine on the merits of glue sizing the bare wood before beginning any finishing operations. We are somewhat of the opinion that where one has contrasting finishes, such as we'll say, a platinum oak, or a finish on oak where a white filler is used, and in some cases where it is necessary to wire brush the wood to get the filler to penetrate properly, we are not sold on this glue sizing operation. In fact, if we were to glue size, we're inclined to believe we wouldn't be able to produce some of the finishes that we now have.

We would like to have your comments, because maybe we're on the wrong track in our finishing program. —*N. Casket Co.*

I feel sure you will find that glue sizing will help produce a more uniform and hence a better finish, even on oak. In fact, some of the largest manufacturers of oak veneered furniture glue size before finishing.

The solids content of a glue size is extremely low; for instance, an average ten to one solution has only about 2% solids, so this would not hinder your filling operation. Its main purpose, of course, is to stiffen the surface wood fibers (those that rise above the surface) to aid the workmen in sanding. They can do a clean job of smooth sanding more easily and more quickly on a glue-sized surface. Also, glue sizing helps to equalize the wood surface by coating and surface hardening the soft spots.

The thin coat of thin glue size also helps to hold up the subsequent coats of finishing material, thus helping to produce a fuller and smoother finish.

Glue size can be put on by spraying or, in the case of flat panels before assembly, by roller coating.

If you find it necessary to wire brush the surface before finishing, it will be perfectly all right to do this to glue sized wood; wire brushing will not affect the glue size. However, where an open-pore oak finish with a contrasting filler is desired, it may not be so important to glue size as where a full high-gloss finish is desired. Many of the larger manufacturers who finish a great quantity of blond mahogany (where the pores are smaller than oak) glue size it before finishing.—*H. W. Chester.*

Who Tumbles in Texas?

I have been a subscriber for several months and have appreciated the wonderful information concerning industrial finishes . . . I have found it very helpful and profitable.

I have the reprint of the article on tumbling small wood turnings. Could you tell me if there is a company located in the southwest, or in or around Houston, that is using this method of finishing?

Further, do you know of any people at all who are using the tumbling method to finish wooden coat hangers? Are there any such companies located in the southwest?

Do you have any information as to gloss finishes on their wooden coat hangers, if they do not use the tumbling method?—*K.P. Co.*

We do not know of any concerns in your state that are using the tumbling method for applying finishes to wood turnings or other small wood parts. We question whether tumbling would be a suitable method of coating wooden coat hangers. However, for more exact technical and engineering information on this particular subject, we are pleased to refer you, by letter, to two companies in New York.

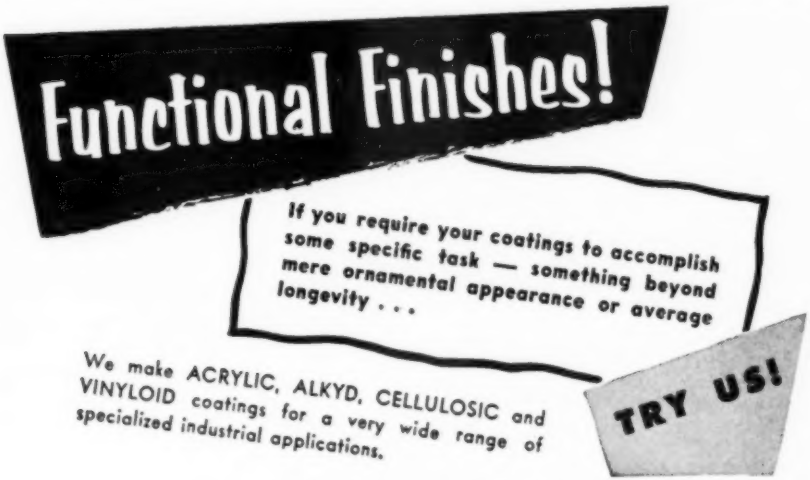
Both of these companies have done a great deal of experimenting and research on tumbling processes and they should be in position to advise you definitely about the possibility of using the tumbling system to coat whatever products you have in mind.

Regarding the gloss of a finish, it would seem to us that you would not get as much gloss by the tumbling method, which calls for thin coats.

In tumbling, the coated articles make contact with one another, which would tend to kill a gloss finish—like rubbing, for instance. For a gloss finish we would suggest spraying or dipping, with no follow-up rubbing or polishing.—*Editor.*

Finished Mahogany Changes Color

In our country (England) there is quite a demand for natural finished veneered "sapele" mahogany dining sets. We find that after a very short time, in a display window, say two or three days, this finish shows a vast change of color. It is very obvious where any articles have been placed on the sideboard or table; the covered


Functional Finishes!
If you require your coatings to accomplish some specific task — something beyond mere ornamental appearance or average longevity . . .
We make ACRYLIC, ALKYD, CELLULOSIC and VINYLOID coatings for a very wide range of specialized industrial applications.
TRY US!

• THE VARNISH PRODUCTS COMPANY
5206 Harvard Avenue, Cleveland, Ohio

part remains much lighter than that exposed to the daylight and sunshine.

We feel that since in the U. S. A. quite a lot of natural finishes are produced, there must have been a lot of research into this change of color trouble. Can you suggest any remedy? —*L. F. Co.*

The problems of finishing wood are the same the world over!

All woods will change color in various degrees when exposed to light, especially strong sunlight through clear glass windows. The tropical woods seem to "mellow" a little more quickly than the hardwoods of the more temperate climates.

There is such a thing as the finish discoloring, so don't confuse the two. Test the raw wood by exposing it to sunlight for a few weeks and compare the wood color to that of wood that has not been exposed. The difference revealed by this test will be about the same as will be found if the wood is given a "natural" finish, that is, a finish that requires no color.

Most manufacturers realize this and stay away from this type of finish, using instead a finish of comparable color but arriving at this color with the use of light-fast stains or pigments. Even with these stains there is a color changing problem, but after and during the change the contrast is not as severe, since a light-fast material has been added and overlaid on the wood. I would suggest using a good stain that gives the color of the finished wood after exposure to sunlight. The finish color would still be acceptable and the discoloration would certainly be less noticeable.—*Ex. Pert.*

I have examined the small sample panel and removed a portion of the finish, and I believe that your trouble is caused by two things:

1) Finishing materials that do not have good color retention qualities.

2) Darkening of the wood from exposure to sunlight, of which natural finished mahogany or unfinished mahogany veneers are very susceptible.

The color retention qualities of your finishing materials can be improved by having your supplier formulate and supply you with materials that are not so easily affected by sunlight. For instance, I suppose that you use a very light amber colored non-grain-raising stain for equalizing the wood and also to produce the "natural" color you have on the panel. This stain should be made from the very best grade of dyes that are as fast to light as possible.

The wash coats, sealers and lacquers should be formulated from resins, solvents, etc., that are as near light-fast as possible.

Some American manufacturers have been using a "screening" agent in water white wash-coats, lacquer toners, etc., to screen sunlight and thus prevent its penetration into the finish and wood, preventing both the finish and wood from changing color from exposure to light. However, insofar as I can learn, the addition of screening agents has not been very successful except when used on two or three of the light colored woods such as korina, hackberry, etc. The reason for this, I understand, is because the chemicals in most woods react to the "screening" agent, thus destroying its screening effectiveness.

In regard to the wood darkening when it is exposed to sunlight, I do not know of any method that has been developed to prevent this—that is, other than what I have just mentioned. Most of the natural finishes in the United States are used on light colored woods such as elm, maple, birch, etc. Our very light colored mahogany has an amber color stain

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ATTRACTIVE ONE-COAT COVERAGE FOR METAL PRODUCTS

Machines — from sewing to adding . . . boxes — from tackle to lunch . . . and hundreds of other metal products look better and stay better looking with Rockford *Wrinkle* Finishes.

In these quality-controlled specialty finishes you get complete, economical one-coat coverage even including metal imperfections and blemishes; a tough, durable protective surface; and a distinctiveness that puts more life into metal items.

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in the finishing schedule. The use of this stain helps to prevent darkening of the color because the dyes used in the stain do not change as fast, when exposed to sunlight, as unstained wood does.—*H. W. Chester.*

EDITOR'S NOTE: In the U. S. A. it is the custom of those who manufacture, sell and use light and natural finished mahogany furniture and cabinets to keep these pieces away from sunlight exposure, especially long exposure (a few hours). After all, the natural raw wood changes color, even with exposure to light, and a clear coat of finishing material can not be expected to prevent this slow mild change of color.

Jute Tow for Padding In and Wiping Filler

The Washington Casket Co., a subscriber to *Industrial Finishing* and a customer of ours, told us how they had started using Jute Tow in preparing their woods for finishing. It seems it was stated in an article you ran some years back, that Jute Tow had excellent inherent qualities in applying filler.

Would we be asking the impossible to obtain a copy of this article? It would be extremely interesting to us, as it is an application for Jute we have not been aware of.—*Dolphin Jute Mills.*

We do not seem to find the particular article you have in mind, published several years ago, about the use of jute tow for padding and wiping off filler in connection with wood finishing. However, we do know that many finishers prefer jute tow for the padding in and first heavy wipe-off of filler that has been applied to wood and hardboard surfaces which are to be finished.

Reasons why they like to use tow? It is soft, very absorbent and they can easily pick up a handful of just the right amount to use for padding in and the major wipe off. They can work with it (padding in and wiping off excess filler) rapidly and vigorously (and wiping across the grain) without any danger of scratching the filled wood surface or pulling out padded-in filler. The filler-loaded (used) tow is then thrown away.

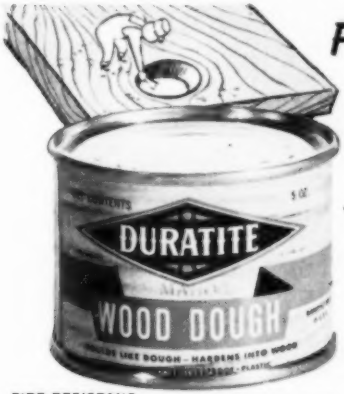
The final clean-up wiping is done more carefully and gently, and generally with the grain of the wood, using soft cloths.

You can easily and quickly obtain some first-hand information on this by visiting the finishing departments of some of your local manufacturers of furniture or cabinets or store fixtures where fine finishing of hardwoods is involved. You can inquire what is being used for this work; you can observe just how the work is being done; and you can offer samples of your jute tow for the finishers to use. This will give you direct and specific information.

Of course, you may find that some of the finishers are "set in their ways" and do not care to use what you have to offer. However, one or two such cases should not discourage you. Remember there are thousands of places in the United States where wood finishing is being done and where filling is involved. Probably some of these finishers will be glad to have an opportunity to use your tow material.—*Editor.*

Herter Joins Ross Engineering As Sales Engineer

Charles R. Herter has joined the Detroit office of J. O. Ross Engineering Corp. as a sales engineer. Mr. Herter, a mechanical engineer, is a graduate of the Illinois Institute of Technology. He was an industrial engineer for two other concerns before joining Ross.



FOR **FAST** FILLS—SOLID AS SEASONED WOOD

8 WOOD COLORS
6 SIZES

DURATITE

WOOD DOUGH

Waterproof — Weatherproof — Plastic

FIRE-RESISTANT

POLISH
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STAIN, PAINT, OR LACQUER

DURATITE Surfacing Putty for *small* holes, dents, cracks and gouges. You get the same top results DURATITE Wood Dough gives in *large* fills.

Safer... Stays in. Positively will not shrink after fast initial drying.

Faster... Easy to fill even ½" cavities in one application.

Better... One user's tests proved DURATITE outperforms *90* competitive surfacers.

GET THE MOST FOR YOUR MONEY. INSIST ON DURATITE. *Write for literature and prices.*

WEBB PRODUCTS CO. *Manufacturers of fine surfaces and adhesives since 1923*
San Bernardino, Calif. • Norcross, Georgia. *Over 2,000 wholesale distributors in U.S. and Canada*

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Screen this maximum endurance Enamel on your volume production products. Delivers more printed area at a greater opacity than competitive brands. Dries to an absolute hardness in 12 hours! Adheres with complete reliability to metal, wood, glass and many plastic surfaces.

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Grand Rapids Varnish Corp. Appoints Representatives

Joseph A. Hager, Vice President and Director of Sales, Grand Rapids Varnish Corp., announces the appointment of two representatives to the Industrial Product Finishes Division of the company.

Robert M. Eastwood and Robert W. Spence.

Appointed as representative in the northern Indiana-Illinois area, is Mr. Robert W. Spence, a graduate of Ohio Wesleyan University and, for the past 12 years, except for 3½ years of war service, in the industrial product finishes industry. Mr. Spence makes his home in Kokomo, Indiana.

Appointed as representative in the Detroit and eastern Michigan area, is Mr. Robert M. Eastwood, a graduate of Wayne University, with a Bachelor of Science degree in Chemical Engineering. Mr. Eastwood spent two years with the United States Navy. He has nine years of technical experience in metallurgy, electro-chemical, and industrial paint technology.

Both Mr. Spence and Mr. Eastwood are well equipped to render, to the customers of the Corporation, the specialized assistance and service which the Corporation holds to be so important.

Interchemical Has New Addition to Its West Coast Facilities

Interchemical Corporation, New York (Finishes Division, Newark, N. J.) announces new manufacturing facilities for its Finishes and In-Tag Divisions in Los Angeles.

The additions comprise a new drum cleaning building of approximately 1000-sq. ft., a nitrocellulose vault of approximately 770-sq.ft. and a 2-story steel and concrete completely fireproof building with overall floor space of 10,000-sq.ft.

The 2-story building will house ball and bebble mills and 1000-gallon mixing tanks for manufacturing industrial finishes and In-Tag inks. The building contains a modern ventilation and dust collector system and a water cooling tower to provide cold water for the mills. Outside, along the railroad siding, are tanks providing 60,000 gallons of solvent storage. Solvents are pumped through meters directly into the mills.

The new plant additions will provide improved service for Interchemical's West Coast customers.

Interchemical Corporation's new building in Los Angeles, Calif., provides added facilities.

Color Combinations That Are Favored

WHAT COLOR combinations make you stop and look? What color combinations make reading easy? The effect of colors in combination, whether for instant appeal or sustained attention, depends on known factors of legibility, according to experts of the Color Research Laboratory of Sun Chemical Corp., Long Island, N. Y.

The perfect eyecatching color is yellow, studies show. Combined with black it provides the most legible of all the color combinations and, for that reason, is used on highway signs. It retains its superiority in poster and package use where immediate legibility is important.

Next in order we have green on white, red on white, blue on white, white on blue. Where signs, posters or packages are to be viewed in normal light, dark characters on a light background are best, Sun Chemical studies reveal.

Where impact is not important and where prolonged attention is given to the printed word—in books and magazines, for example—black on white is the best of all combinations. In brilliant light, black on ivory, or cream, very good. Bright colors, for the most part, should be avoided in order to get away from distressing eye-images which cause eye strain, Sun Chemical studies report.

Screen Prints Round Surfaces

Atlas Silk Screen Supply Co., 865 Milwaukee Ave., Chicago, has developed a new Jig for industrial silk screening on cylindrical objects. The Streamliner prints cleanly on containers—from tapered glass tumblers to steel drums.

Lacquer-Stik

a Wipe-on for quick permanent coloring of stampings, engravings, symbols and designs

For use on metal, glass, ceramics, plastics

Permanent marking of stampings, engravings and designs is made easy by the use of Lacquer-Stik. Just apply—wipe off excess . . . and you have a permanent mark. Used for marking radio and television dials, knobs on stoves, graduations on instruments, etc.

8 colors to choose from

WRITE FOR SAMPLE.

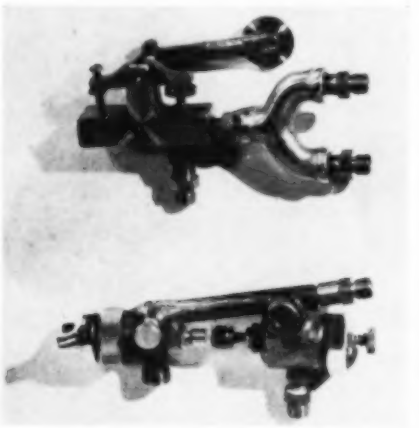
LAKE CHEMICAL CO.

LACO

3101 W. Carroll Avenue, Chicago 12, Illinois

Automatic Spray Gun and Trip Valve

Announcement is made of an improved "G. M." Automatic Spray Gun and Trip Valve, whereby two blasts of air are projected through the gun instead of only one blast. The first blast being uninterrupted, flows through the gun and cleans the nozzle, and at the same time blows upon the article being sprayed, dusting off or cleaning same, while the second blast of air follows almost simultaneously, causing the mechanism to work and spray the article with whatever fluid or paint material is being used.



The new "G.M." trip valve and spray gun.

This spray gun or a series of the guns can be mounted vertically or horizontally, either on a portable stand or permanently in the spray booth, just so there is a method or means to trip the valve. This feature will be of interest to concerns now using or planning to use automatic spraying.

The automatic spray gun is made from a heavy brass casting, with stainless steel needle and nozzle, hand lapped, and has an adjustable needle feature which allows the operator to adjust the needle without removing the spray gun from its mounting. With no off-spray, this means a cleaner shop and a more economical operation.

These new devices are products of Chicago "G.M. Mfg." Co., 546 W. Lake St., Chicago 6, Ill.

Detrex Develops New Product For Spray Washers

Development of a new alkaline cleaner for use in mechanical spray washers prior to phosphate coating —one that is entirely free of caustic soda—is announced by the Detrex Corp., Detroit, Mich., manufacturer of industrial metal-cleaning equipment and chemicals.

By eliminating caustic soda, the crystalline structure of the phosphate coating is made much finer and more effective.

Among the factors taken into consideration in arriving at the new formula were excessive foaming at high concentrations, a problem created by certain similar products, and high water hardness (25 to 40 grains) which had to be overcome in such areas as Indiana and Ohio.

HERE'S A DOWN-DRAFT PAINT SPRAY BOOTH THAT COSTS LESS—WORKS BETTER

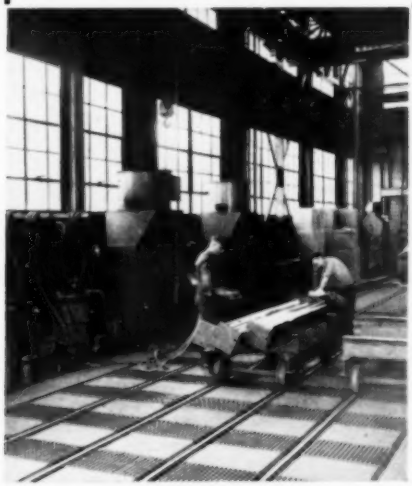


Photo Courtesy of St. Paul Structural Steel Co.

With R P Paint Arrestors, of course!

This structural steel company had difficulty controlling paint overspray in a conventional booth. R P Paint Arrestors installed below the floor grills simply, economically provided the solution—with a minimum disruption of regular production. Your plant can benefit, too, with the R P way to paint spray booth efficiency, economy, convenience.

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RONCI SPEEDIP WHIRL ENAMELER

Made in Two Sizes, R-100 and R-200 Capacity 312-cu.in. and 1206-cu.in.

IDEAL FOR LACQUERING AND ENAMELING SMALL PARTS UP TO 7-IN. IN LENGTH

CUTS COSTS, SAVES UP TO 80% OF MATERIAL

Carries up to 75-lbs. per load, and up to 30 loads per hour can be coated with lacquer or enamel in these machines.

All operations are within the machine. Dipping tank is raised, submerging the parts in the basket, and then lowered and the parts whirled, throwing off excess material. No additional outside tanks required; no cleaning necessary when changing colors; no loss of material.

Prompt Deliveries

Write for further information and submit samples to be coated.

RONCI MACHINE COMPANY

A Division of F. Ronci Co., Inc.

2 ATLANTIC BOULEVARD CENTREDALE 11, R. I.

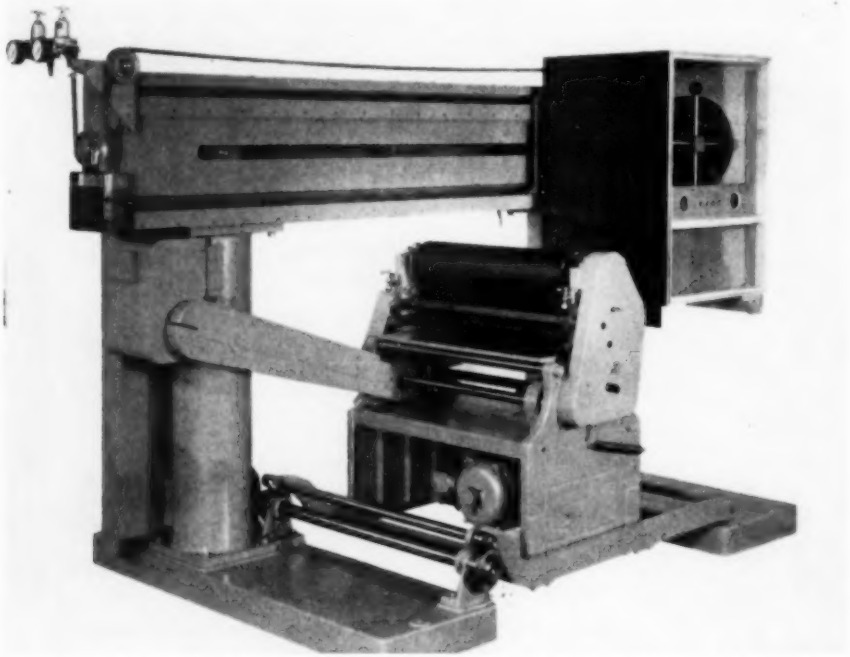
New Wood Grain Printing Equipment

Finishing Systems, Inc., 4736 Crittenden Drive, Louisville 9, Kentucky, announces the development of two new types of offset printing machines to reproduce wood grain and other fancy effects. This new offset equipment gives excellent grain reproduction.

Two styles and size printers are offered. The small "bottom type" printer will print flat panel stock approximately 24½-in. in width, and up to any length; the "top printer" will also do flat panel work, but up to 48-in. in width, and to any length. Both machines are of the continuous print, fully automatic and self inking type of equipment.

The basic printer developed by Finishing Systems, Inc., is a horizontal printer, known by the trade name of "Bellewood". The basic machine is used to do flat panel parts, whether made of wood, metal or composition board. Recently, the company developed an automatic device for holding television or other built-up cabinets, which permits the top and sides of a cabinet to be printed perfectly and speedily with a minimum amount of labor.

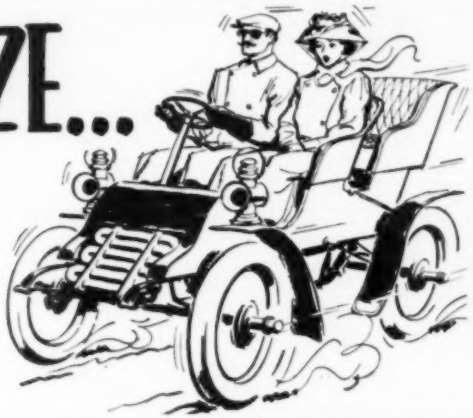
The "Bellewood" equipment will not only do flat panel stock, but will also perform satisfactorily on curved surfaces and edges, which should be of interest to manufacturers producing "wrap-around" style television cabinets or other producers who desire to



Power graining machine prints wood grain on the top and sides of assembled TV cabinets.

MODERNIZE...

USE Electro-Cold STRIPPER



NON-INFLAMMABLE
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Removes hard baked-on enamels, primers, wrinkles, hammers, synthetics, japans, and 3M Scotchlite in seconds in most cases, and minutes in others. *The finish literally pops off!* There's no delay in getting metal items back in production when ELECTRO COLD STRIPPER is used.

It is safe, non-inflammable and requires no heat. Used by leading industrial concerns and Government agencies. TRY IT!

Write for samples—or order 5 gallons at drum price.

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PIONEERS IN ENGINEERING, MANUFACTURE AND INSTALLATION OF

INDUSTRIAL OVENS
SPRAY BOOTHS
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AIR SYSTEMS

ESTABLISHED 1912
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For Bulletins and Quotations, Wire, Write or Call—
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Detroit 11, Mich.
TR 3-2100

print wood grain or fancy effects on bowed or contoured surfaces or edges.

These machines are fully automatic and can be equipped with variable speed controls. They are ruggedly constructed, and can be set up quickly and easily without a great deal of technical assistance or worker training.

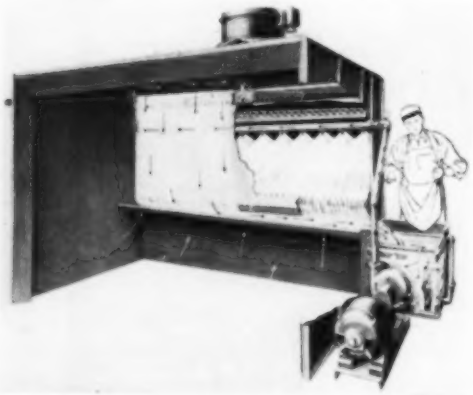
New Self-Cleaning Booth Cuts Maintenance Costs

A new water wash airfinishing booth that permits the removal of collected paint sludge and off-spray in seconds instead of hours is now being introduced by the Paasche Airbrush Co., 1909 Diversey Parkway, Chicago 14, Ill.

Called a "self-cleaning" type by the maker, in actual operation it produces savings of $360 to $1800 a year, depending upon the size of the booth, by eliminating the time cost of messy cleaning and scraping operations required to clean ordinary types of water wash booth installations.

All sludge and off-spray are automatically collected in a new filtering device immersed in the overflow section of the booth. A filter bag strains foreign material out of the water so that the booth is filtered clean. When the filter bag is filled with sludge, it is removed and a new, clean bag put in place. This operation takes only seconds compared to hours for scraping.

This cut-away picture shows what's back of water curtain in new self-cleaning booth.



Besides the saving in maintenance time, cleaning and upkeep cost made possible by this new self-cleaning feature, Paasche Co. points out that it also saves valuable production time now wasted while the operator or a plant maintenance man removes sludge from the tank. None of those costly shutdowns are required for booth cleaning.

Longer life for pumps, motors, nozzles and other parts of the booth is assured by the continuous circulation of clean, filtered water. Also, the new self-cleaning booth helps to reduce fire hazard from accumulated paint scum and sludge, as well as promoting increased worker efficiency through better health safety.

Because of the flexibility of the self-cleaning feature, it is adaptable to existing water wash booths. Special conversion units are available for users of Paasche equipment, and may be installed without great cost on back-wash, 2, 3 or 4-side wash booths.

Consultant Service
C R S Metal
Finishing Consultant

Have returned from a world business trip, including Australia, Singapore, Italy, Spain and England.

Types of industry covered were metal fabrication plants. Have 25 years experience, covering all types of finishing materials, equipment and methods, and am now available for making a survey of your metal preparation and paint finishing operations, which would include a report of my findings together with recommendations for reduction in the cost of finishing your product and improving its appearance.

C. RAYMOND SYER
Box 187 Pacific Palisades, Calif.

Two Inventions for Automatic Spray Painting Machines

Putting more "automatic" into automatic spray coating machines describes two new inventions of D. J. Peeps, engineering vice president of the DeVilbis Co., Toledo, Ohio, manufacturer of spray painting equipment. The inventions have been assigned to the company.

One invention is designed to move spray guns in synchronization with an article being sprayed and returning the guns to a starting position so another article can be coated in the same manner.

The most important factor of the invention is the positive rapid return movement of the spray guns to the starting time. The invention aids in the maintenance of high production by making the return movement rapid and unvarying.

The other invention is a signalling device which is operated pneumatically. This device is designed to actuate the spray guns when an article is present on the conveyor-supports of the automatic machine. If the support is empty, the device will not actuate the gun. The operation of the signalling device is dependable in transmission because of the pneumatic operation. Detecting devices operated mechanically sometimes fail to give a signal if the article on the spindle is too light.

Oakite Zinc Phosphate Coating for Iron and Steel

Oakite Products, Inc., announces the addition to the company's prepaint conditioning materials of Oakite Crys-Coat SW, a new zinc phosphate coating material for iron and steel, designed for use in pressure-spray washing machines. [*To page 126*]

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- LOW COST
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- MAR RESISTANT

Oakite CrysCoat SW provides a fine-grained, dense and uniform zinc phosphate coating on iron and steel that meets U. S. Government specification Jan-C-490, Grade I, and similar specifications. The coating weight ranges from 180 to 220-mgs. per square foot. One-minute application in the phosphating stage of a 5-stage pressure-spray washing machine is usually sufficient to obtain the coating weight desired.

Among the merits claimed for Oakits CrysCoat SW are the following: 1) Its zinc phosphate coating develops rapidly on metal surfaces, particularly in deep cavities, eliminating rusting difficulties; 2) The coating is fine-grained, dense and relatively non-porous; 3) The solution is highly buffered for long long life; 4) The product is inhibited for safety on equipment surfaces; and 5) The only upkep required to maintain an operating solution is the material itself—no special toners or additives are needed. Upkeep is easily determined by a titration procedure using equipment supplied free of charge by the manufacturer.

A special Service Report, giving application details of Oakite CrysCoat SW, will be sent to readers writing on company letterhead to Oakite Products, Inc., 132F Rector St., New York 6, New York.

Plastic Sprays On; Peels Off

The development of a new spray-on, peel-off type plastic package is announced by Munray Products, Inc. This new packaging product is designated at "Peel-Kote."

"Peel-Kote is the refined development of spray-on plastics used during the last war to protect military equipment, precision parts and later as a 'moth balling' material. Extensive research work has resulted in the development of a superior coating which is easy to apply, easy to remove and which can be furnished in a wide range of colors as well as water-clear."

It has extremely high adhesion characteristics and at the same time will peel off rapidly in continuous easy-to-handle strips. Its high solids content permits fast, heavy build-up of film for maximum protection of metal and easier stripability.

Peel-Kote has a high degree of elasticity, has high resistance to abrasion and when dry will not support combustion. It is normally sprayed, but special formulations can be supplied for dipping. It is immune to the attack of most corrosives and the manufacturer claims it can be stored indefinitely without any undesirable effects.

Peels off easily, quickly, safely.

For additional information write to Vernon K. Jack, Sales Manager, Munray Products, Inc., 12400 Crossburn Ave., Cleveland 11, Ohio.

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Deliver amazing performance; are easy to apply, economical, durable and strikingly beautiful!

For a better finish at lower cost: ORDER A TRIAL GALLON CAN AT DRUM PRICE! Convince yourself! Money refunded if not completely satisfied.

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Kirco Lacquers Meet the Rigid Specifications of the RMA

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Plan For Maintenance To Save Money Later

DID YOU KNOW that industry is spending about ten billion dollars a year for plant maintenance? Some of the money is spent wisely, but unfortunately some of it represents penalties that are being paid for unwise planning at an earlier time.

Let us consider the negative side of the question first. Plant maintenance that is not planned and executed according to schedule becomes unprofitable and costly too. Unplanned maintenance often results in costly breakdowns of equipment. This not only retards production; it is often necessary to go into time and a half and double time periods in order to repair the damage. Needed repair parts may not be on hand; may have to be ordered from out of town, causing extra delay as well as added expense. All of these additional expenses must ultimately be charged to the cost of product.

With a well planned maintenance program, at least 90% of the work can be scheduled in advance. Overtime may not be required. The maintenance crew will not be working under pressure, therefore they will be able to do a much better job. All of the equipment will be better cared for, and its useful life will be extended. There will be fewer breakdowns; fewer delays. Worn parts will be detected and replaced before a breakdown occurs.

Clean, well lubricated equipment promotes smooth, uniform trouble free production. Such a system will in-

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TENAX FINISHING PRODUCTS CO.
NEWARK, N. J.

clude an inventory of replaceable parts, thus eliminating long distance calls or wires, and then waiting for parts to arrive. Equipment that is properly maintained is an asset to any business.—*J.M.*

White Baking Enamels Resist Alkalies, Acids, Heat, and . . .

Three new, non-yellowing white baking enamels that have superior adhesion, flexibility, hardness and durability, are announced by The O'Brien Corp., South Bend 21, Ind. These white enamels are particularly suited for home appliances, laboratory equipment, steel furniture and cabinets, etc.

Their characteristics include resistance to salt spray and humidity cabinet tests, acids, and alkalies, detergents and greases, They have excellent color and gloss retention.

Identity of the three enamels: S-1172 White Baking Enamel, S-1226 Acid -Resisting White Baking Enamel, and PX-8403 Heat Resistant, White, Alkyd Baking Enamel.

Temperature Indicators Like Crayons

Temperature indicators such as, Tempilstiks°, a crayon; Tempilaq°, a liquid; and Tempil° Pellets, temperature indicating pellets—these have aided industry in solving temperature control problems.

Wider temperature ratings in the 400° to 500° F. range have been developed. These include such temperatures as 413°, 425°, 438°, 463°, 475°, and 488° F. For detailed information on these products, write Tempil° Corp., 11 West 25th St., New York 10, N. Y.

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in the A. E. S.

are cordially invited to visit our Hospitality Headquarters at the Statler Hotel in New York during the Annual Convention of the American Electroplaters Society.

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GRAND RAPIDS 9, MICH.
See Yellow pages for your local sales representative

Industrial FINISHING Editorial

Utilize Your Supplier To Avoid Bad Finish

★ A good paint foreman is forever looking for and anticipating trouble before it happens. For instance, your bake oven should be checked at least every six months. We check ours by means of a smoke chart test. Most ovens have a thermostat that automatically keeps the temperature at the proper heat for some particular baking cycle.

There is a good possibility that if a smoke chart test were taken, the results would be quite different from the thermostat reading. A comparison of charts taken at different times will reveal at a glance if the oven is operating properly, or if something seems to be wrong.

Also, when and if you should change to a different color or another brand of paint, the baking of your product may show up very unsatisfactory due to the different formulation of the paint, or because your oven is not heated to the correct temperature or regulated for the right baking cycle to suit that particular material.

Most of the paint manufacturers have service men on the road and will send one of them into your plant to take this reading for you. You do not need to buy this equipment; your paint supplier has it and he will gladly make one of these tests for you without any obligation. After all, it is to his advantage as well as yours, to know exactly the conditions under which his product is being or will be used. Usually he can and will supply you with material that will work satisfactory for your setup.

When or if you decide to try another brand or make of paint or enamel and can give definite baking data to your new supplier, the results will probably be better than formerly, for that supplier will simulate your conditions and baking cycle and give you a tested material to work with.

We also have our washing (metal cleaning) machine checked periodically and in a manner that will test our paint as well. Our chemical supplier will bring in six oily panels and send them through our washer in the standard manner. Three of these are painted in our shop, using our paint, and the paint is baked according to our prescribed method. The other three are taken to their laboratory and painted with their standard testing paint. Then all six panels are subjected to a salt spray test and a report is mailed or given to us, showing the results.

This procedure gives us a double check; it not only checks our washing machine but it will also tell us whether or not we are likely to have trouble with our paint finish.

Our chemical supplier has no interest of any kind as to the make or supplier of our paint, so this firm will give us an impartial report on the results of the tests. If it should happen that all six panels show negative, then our washer is at fault and steps would be suggested to correct that condition.

Your degreaser, stripper and automatic sprayer can be checked for efficiency and proper conditions. Check and recheck frequently. One of those checks is likely to save you a lot of grief and headaches. It may save your company a lot of complaints and money, and in addition you will have the satisfaction of knowing that your finished product will be as right as you intend it to be.—*Al. G. Kling.*

Good Work and Sales Keep You on Payroll

★ Sales consciouness as the key to jobs and prosperity has taken over as the theme of an employe attitude-conditioning program now being conducted in 7500 companies in the U. S. and Canada.

The importance of employes "being quality, cost and customer conscious" is being promoted aggressively in the latest series of weekly poster bulletins being supplied to these leading companies by Kelly-Read & Company, Rochester, N. Y., personnel development specialists.

The illustrated, multi-color posters carry messages like:

"Sales keep us in Business—and we can only sell good work."

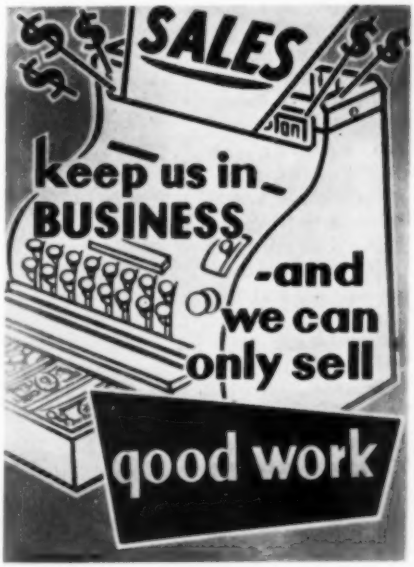
"Stop! Look! Will it please the Customer?"

"Make it to Sell. More Sales, More Jobs!"

Object of this timely program is to impress on employes that the "margin for error" in business during the post-World War II boom period is no longer present.

In those recent boom years the pent-up demand for goods was so great that customers would accept almost anything at any price. Now this is all changed. The "margin for error" has disappeared, making it imperative for all industry to produce better and cheaper.

It has become apparent that continued prosperity depends on the ability of business and industry to *turn out quality goods and services at lowest possible prices.* This prosperity starts with the attitude of the employe to his job, so it is essential to encourage job attitudes consistent with a competitive business picture.



One of the posters that reminds you.

By keeping employes constantly reminded of the need for quality work, fewer mistakes, less waste, the need for serving customers, and of keeping sales up, industry and business are bound to do more and better business in spite of the return to a more competitive market.

That's why it is so important to convince employes that sales keep a firm in business and employes in jobs —and the only way to keep sales and customers coming is by turning out top quality work every day.—*H. A. Wolff.*

Spraying Lampshades, and Radio Active Protection

THE BIG RAGE in the lamp shade industry is the bubble shade; that is a wire frame shaped like a Chinese lantern and sprayed with vinyls, controlling the pressure on a standard spray gun so that the vinyls do not atomize. The extremely low air pressure permits the vinyls to leave the nozzle of the spray gun in an end-to-end formation which resembles a cobweb. This webbing builds itself up across the wires of the lampshade until a solid web is formed; then it is sprayed with a clear coat of vinyls, and the completed shade resembles a marbleized parchment.

Due to the demand for this this type of shade I designed, for a leading spray equipment manufacturing company, a semi-automatic spray unit which allows a shade to be completed in 4¾ minutes; and one operator can easily take care of several units. With four units, one operator is making one lamp shade per minute.

I have heard several people say, "Why go to all that trouble just for a lamp shade?" One can very easily see their lack of imagination. On several occasions the newspapers have published pictures and articles describing the vinyl protective film as a safeguard against radio active materials. If the atom bomb is a reality and if vinyls will offer a certain amount of protection, then the spraying of vinyls is a must. The vinyl lamp shade rage automatically carries us into the best method of spraying

Designed for surface finishing flat or contoured products, this double-roll machine provides automatic float of buffs at any predetermined pressure. Hydraulic "in" and "out" stroke is adjustable from 0″ to 24″, and automatic spray equipment is available.

Write for Bulletin 202

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MANUFACTURING CO., INC.
Specialized Machine Equipment For Glazing and Polishing Operations
OLEAN, N. Y.

life's protective film. Formulating tough flexible vinyl films for lamp shades is formulating tough flexible films for life's protection.

Designing spray equipment for lamp shades may be designing equipment for a fast conversion program in case of war. It is more than possible that we will be using the spray gun to protect health and life.—*W. Beacham, Finishing Consultant.*

Two Sales Executives Named by Pittsburgh Plate Glass

Two personnel changes involving executive sales positions in Pittsburgh Plate Glass Co.'s paint division are announced.

Howard J. Mather was named general manager of industrial sales for the paint division. Since 1949 he has been assistant general sales manager, industrial finishes.

Howard J. Mather and George P. Myers.

George P. Myers becomes industrial sales manager of the Suydam Division in Pittsburgh. Prior to his appointment, he was assistant general sales manager of industrial finishes.

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All paint restored to original consistency without opening the can.
2 minutes per gal.
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Any test in F. S. TT-P-141b
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ATTENTION PLANT MANAGERS
PLANT ENGINEERING NOW AVAILABLE BY
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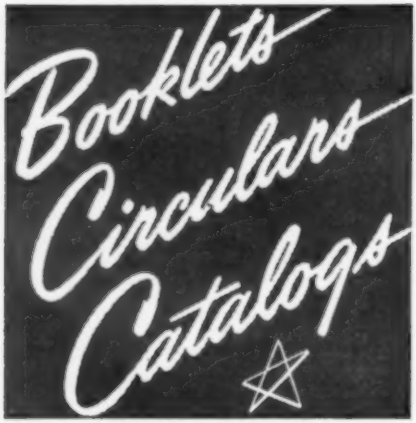
Specializing in paint finishing systems, conveyors, ovens, dust collection, ventilation and spray washing machines. Let us help you save on
CAPITAL INVESTMENTS and MAINTENANCE COSTS
We excell at: Designing, problem solving, specification writing, cost estimating, fabrication drawings and project follow-up. We are a neutral source.



Stir and Pump From Container to Gun, Tank, Rollers, or . . .

Just published by the Alemite division of Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill., and available to anyone in industry, is a 32-page catalog of "Versatal" materials handling equipment, which is encyclopedic in its scope.

A typical Versatal system consists of:

1) Air operated pump, which removes material from original container and forces it, at desired pressure and rate of delivery, through

2) Pipe, tubing and/or hose, to

3) Spray guns, extruding guns, or other types of control valves at point of application.

Pump automatically delivers material as required, so that the entire operation of Versatal system is controlled at the point of application.

Water Wash Spray Booths

A new 12-page bulletin, No. 4938-B, on standard and heavy duty water wash spray booths is available from Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich. The bulletin describes the firm's line of factory-tested Roto-Wash booths which draw air into the washing chamber at both the top and bottom of the water curtain. Included is data on efficiency tests . . .

Folder on "Dip-Pak" Uses

Fidelity Chemical Products Corp., of 470-474 Frelinghuysen Ave., Newark, N. J., offers a new, up-to-date 4-page leaflet detailing "Dip-Pak," a hot-melt plastic coating. The types of "Dip-Pak" are listed, including the base plastics, colors, phyical properties, corrosion resistance, melting and application heat for each.

The folder explains the extra protection which "Dip-Pak" offers in safeguarding tools, gears, and precision parts from corrosion or damage during storage and shipping.

Fidelity's research chemists will recommend the right Hot-Melt Plastic Coating for a particular need. The company will supply information concerning the amount of "Dip-Pak" formula needed for a given period, correct size of "Dip-Tank," as well as quotations and samples.

Chemical Fire Equipment

Fifteen technical bulletins covering the use of dry chemical fire equipment are available from Ansul Chemical Company, Marinette, Wisconsin.

Air and Sandblasting Nozzles

A new catalog describing its line of airblast cleaning nozzles has been published by American Wheelabrator & Equipment Corp., 1144 S. Byrkit St., Mishawaka, Ind. Three standard models of nozzles are described. Also included are pressure blast hose fittings for standard airblast nozzles.

"Metacote" Cleans and Phosphatizes

Metasurf Corporation, 12830 Eaton Ave., Detroit 27, Mich., has published and will be glad to furnish on request technical data on Metacote, a new method of simultaneously cleaning and phosphating metal surfaces prior to finishing.

Metacote cleans thoroughly and is effective on most all types of soil. It deposits a hard, tight, close grained phosphate coating on the metal surface which inhibits corrosion and acts as a bonding film for the subsequent finish.

Metacote may be used on steel, iron, aluminum, zinc, cadmium—in fact, on practically all metals and alloys. It may be used in mild steel spray washers or in immersion processes. It is supplied in powder form and used at low concentrations in a water solution. There is no control or maintenance problem as no heavy sludge or scale is formed.

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A service to aid industry in producing longer-lasting and better-looking products. Quick predetermination of durability and permanency by actual exposure test in South Florida. Write us today for full information.

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EST. 1931

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Position All Work So It's Easy to Reach

DID YOU EVER walk through a plant and observe operators struggling with, and juggling parts on which they were working? I have seen spray operators bending, stooping, crouching, stretching, and standing on one foot in an effort to coat the product all over. To let a condition like this continue very long is costly business—from two standpoints. First, it definitely slows down the spray painting operation. Next it accelerates operator fatigue. A near exhausted operator cannot turn out the volume nor quality of work, as compared with an operator who is working with the correct tools and accessories, and under proper conditions.

Jigs, racks and work holders can be designed and built (or purchased) to hold the product in any one or more positions desired. It can be arranged to swivel, make a 180° or even a 360° turn, or tilt at various angles.

Conveyors can be arranged to enter the spray booth at levels so that the lower areas of the product will be spray painted by an operator standing in an upright position. One automobile manufacturer even installed overhead bridges in his downdraft spray booths to make the work easier for workmen. Operators are stationed on these bridges to spray primer and top coat enamel down on the top of auto bodies passing through the booths. [*Continued on page 136*]

ECONOSTRIP

NEW LOW COST STRIPPER

STRIPS CLEAN IN 20 SECONDS

and that's not all!

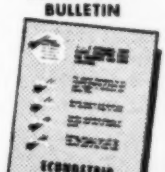
- **WILL NOT HARM NON-FERROUS METALS**
- **WILL NOT REMOVE PHOSPHATE COATINGS**
- **IS HIGHLY EFFICIENT FOR CONTINUOUS CONVEYORIZED STRIPPING**
- **LASTS LONGER WITHOUT WEAKENING**

ECONOSTRIP is a brand new, easy to use stripper for removing so-called "impossible to strip" finishes from metals. Most finishes pop up in a matter of 20 seconds. Stripped material is flushed off with water and the clean surface is ready for repainting. Aluminum and other soft metals are not affected by ECONOSTRIP.

ECONOSTRIP lasts longer. Losses by evaporation and drag-out are replaced with a very low-cost additive which restores the solution to its original strength. Additive is formulated to replace just the ingredients lost, thereby preserving ECONOSTRIP in perfect balance and economically increasing its tank life.

There is a Beck stripper for removing all types of finishes from metal and wood. Custom formulations can be made for difficult problems and for conveyorized systems where standard strippers will not work as fast as desired. Beck Laboratories are at your service. Consultation invited. Write us for detailed information.

SEND FOR BULLETIN



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PAINT SPRAY – DUST – FUMES

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H. S. COVER, South Bend, Indiana

Each plant, according to its size and volume of production, should have one or more men capable of planning, designing and building suitable racks, work holders and jigs for holding parts in process. As long as manual work has to be performed on any part, however small, that part is just as important as the product itself.—*W.T.*

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- TONERS
- GLAZES
- PIGMENTED WIPING STAINS
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Complete Technical Service At Your Disposal

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Manufacturers of Quality INDUSTRIAL LACQUERS
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Bulk or Bagged
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—what they are and how to use them.
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EASTPORT, MAINE

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METAL FINISHING CONSULTANT
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DRUM PLUG WRENCH
Instantly loosens, tightens 95% all plugs or bungs in steel drums. Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs.
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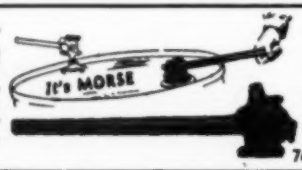

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Thomas Fabian Becomes a V.P. of Chemlite P. & V. Co.

Mr. Dulberg, president of Chemlite Paint & Varnish Corp., Lodi, N. J., announces the appointment of Mr. Thomas Fabian as vice president and General Manager in charge of sales.

For the past 18 years, Mr. Fabian was a salesman for a finish manufacturer in Philadelphia. Prior to that, he was selling for a finish manufacturing company of New York. Originally he gained valuable experience as superintendent in charge of finishing of all the plants of the Aeolian Piano Company, in New York.

With this technical background and experience Mr. Fabian will be a valuable asset to Chemlite Paint & Varnish Co.

P. W. Binckley Appointed By National Chemical & Plastics

The National Chemical & Plastics Co., Baltimore, Md., announces the appointment of Paul W. Binckley ("Binck") as District Sales Manager. "Binck" has been identified with the industrial finishing business for the past 30 years and his expert knowledge of products and methods of application has earned him the confidence of many users of finishing materials.

He will represent the company as District Sales Manager of Pennsylvania, New York and the New England States.

"Binck" is a member of the Masonic bodies and B.P.O.E. His hobbies are golf, hunting and fishing. He is married and lives in Danville, Penna.

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BLACK
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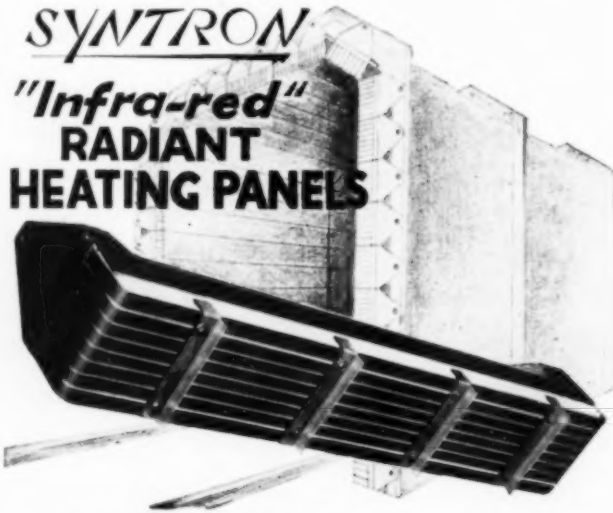

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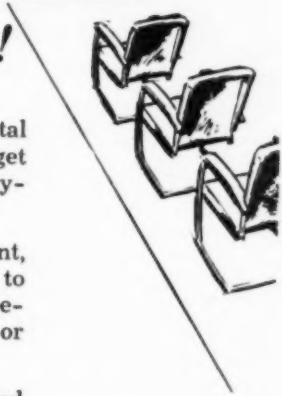

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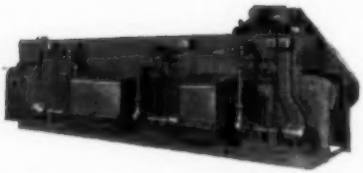

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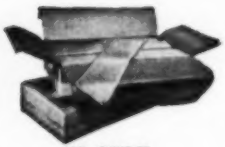

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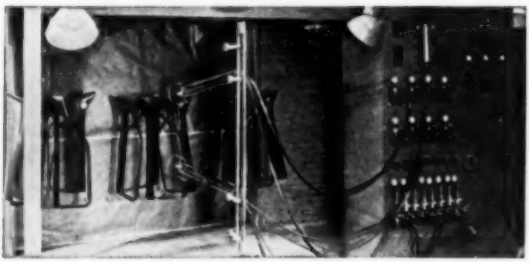

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